



Patent Cooperation Treaty

Procedural Aspects & Recent Trends

**PG Diploma in Patents
NALSAR University of Law, Hyderabad
Contact Classes
July - September, 2015.**



The Patent Cooperation Treaty is an agreement for international cooperation in the field of patents.

It is a treaty for rationalization and cooperation with regard to the filing, searching and examination of patent applications and the dissemination of the technical information contained therein.

The PCT does not provide for the grant of “international patents”: the task of and responsibility for granting patents remains exclusively in the hands of the patent Offices of, or acting for, the countries where protection is sought (the “designated Offices”).



The Patent Cooperation Treaty or “PCT” entered into force on 24 January 1978, and became operational on 01 June 1978, with an initial 18 Contracting States.

Presently 148 Contracting States had adhered to the PCT.

Came into force for India on 07 December, 1998.

Filing and not granting.



PCT Contracting States (148)

EA Eurasian Patent

AM Armenia
AZ Azerbaijan
BY Belarus *
KG Kyrgyzstan
KZ Kazakhstan
MD Republic of Moldova *
RU Russian Federation
TJ Tajikistan
TM Turkmenistan

EP European Patent

AL Albania (from 01.05.2010)¹
AT Austria
BE Belgium *
BG Bulgaria *
CH Switzerland *
CY Cyprus
CZ Czech Republic
DE Germany *
DK Denmark *
EE Estonia
ES Spain
FI Finland
FR France *
GB United Kingdom
GR Greece *
HR Croatia¹
HU Hungary
IE Ireland *
IS Iceland
IT Italy *

LI Liechtenstein
LT Lithuania
LU Luxembourg
LV Latvia *
MC Monaco *
MK The former Yugoslav
Republic of Macedonia¹
MT Malta *
NL Netherlands *
NO Norway
PL Poland
PT Portugal
RO Romania
SE Sweden
SI Slovenia *
SK Slovakia
SM San Marino (from
01.07.2009)
TR Turkey

* Regional patent only

¹ Extension agreement continues to apply to applications filed before 1 January 2008 (for HR), 1 January 2009 (for MK) or 1 May 2010 (for AL)



PCT Contracting States (148)

AP ARIPO Patent

	BW	Botswana
	GH	Ghana
	GM	Gambia
	KE	Kenya
*	LR	Liberia
	LS	Lesotho
	MW	Malawi
	MZ	Mozambique
	NA	Namibia
	SD	Sudan
	SL	Sierra Leone
*	SZ	Swaziland
	TZ	United Republic of Tanzania
	UG	Uganda
	ZM	Zambia
	ZW	Zimbabwe

OA OAPI Patent

*	BF	Burkina Faso
*	BJ	Benin
*	CF	Central African Republic
*	CG	Congo
*	CI	Côte d'Ivoire
*	CM	Cameroon
*	GA	Gabon
*	GN	Guinea
*	GQ	Equatorial Guinea
*	GW	Guinea-Bissau
*	ML	Mali
*	MR	Mauritania
*	NE	Niger
*	SN	Senegal
*	TD	Chad
*	TG	Togo

* Regional patent only



PCT Contracting States (148)

AE United Arab Emirates	GT Guatemala	NI Nicaragua
AG Antigua and Barbuda	HN Honduras	NZ New Zealand
** AL Albania ¹	ID Indonesia	OM Oman
AO Angola	IL Israel	PE Peru
AU Australia	IN India	PG Papua New Guinea
** BA Bosnia and Herzegovina	JP Japan	PH Philippines
BB Barbados	KM Union of the Comoros	** RS Serbia
BH Bahrain	KN Saint Kitts and Nevis	SC Seychelles
BR Brazil	KP Democratic People's Republic of Korea	SG Singapore
BZ Belize	KR Republic of Korea	ST Sao Tome and Principe
CA Canada	LA Lao People's Democratic Republic	SV El Salvador
CL Chile	LC Saint Lucia	SY Syrian Arab Republic
CN China	LK Sri Lanka	TH Thailand
CO Colombia	LY Libyan Arab Jamahiriya	TN Tunisia
CR Costa Rica	MA Morocco	TT Trinidad and Tobago
CU Cuba	** ME Montenegro ²	UA Ukraine
DM Dominica	MG Madagascar	US United States of America
DO Dominican Republic	MN Mongolia	UZ Uzbekistan
DZ Algeria	MX Mexico	VC Saint Vincent and the Grenadines
EC Ecuador	MY Malaysia	VN Viet Nam
EG Egypt	NG Nigeria	ZA South Africa
GD Grenada		
GE Georgia		

** Extension of European patent possible

1 Extension of European patent possible for International applications filed before 1 May 2010

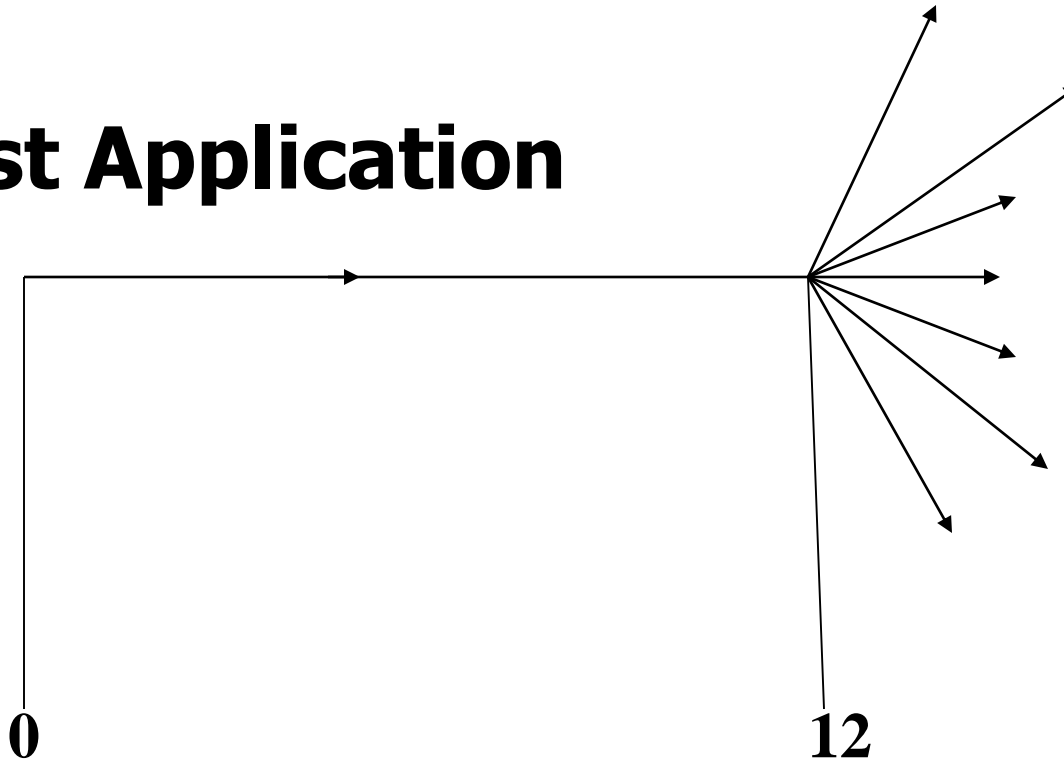
2 Extension of European patent possible for International applications filed as from 1 March 2010

PCT Contracting States





First Application

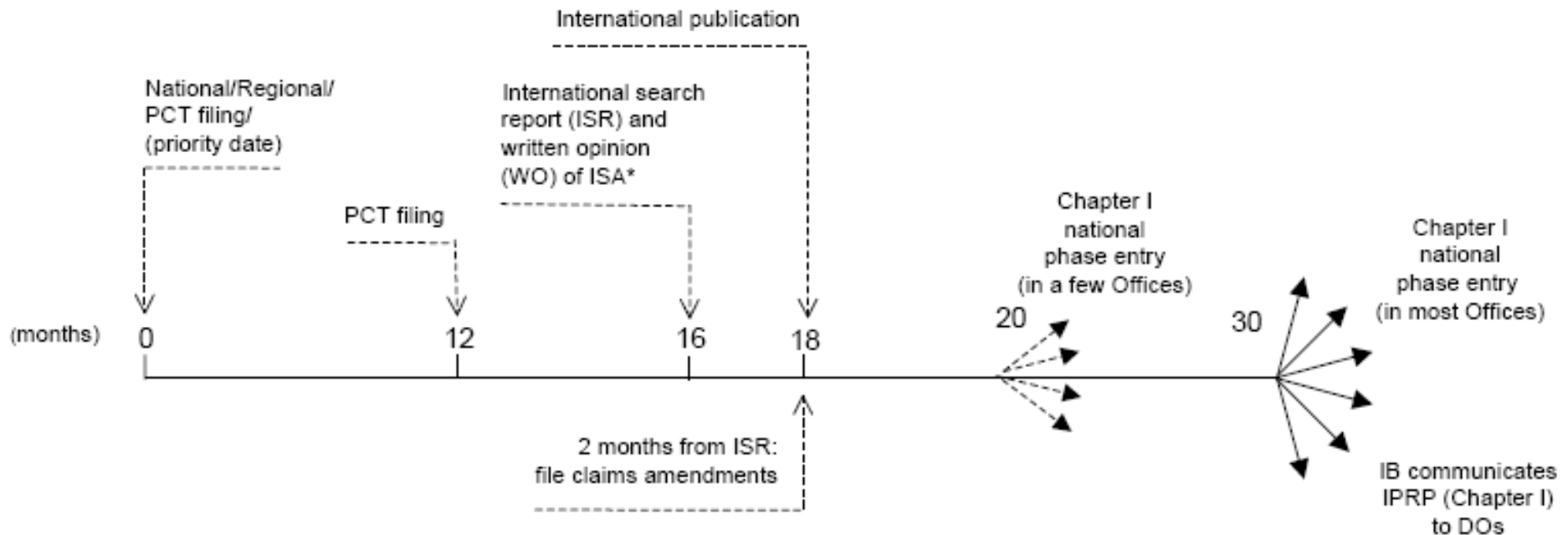


**Family
Application**

TRADITIONAL



PCT TIMELINE - Chapter I only (for international applications filed on or after 1 January 2004)



* If PCT is a first filing, the ISA is to establish the ISR and WO of the ISA before the expiration of 9 months from the priority date (Rule 42.1)



Non-applicability of time limit of 30 months under Article 22(1)

- The Offices of the following States have notified the International Bureau that they will not apply the 30 month time limit under Chapter I, as of 1 April 2002, for as long as modified Article 22(1) is not compatible with their national law:
 - LU Luxembourg
 - TZ United Republic of Tanzania
 - UG Uganda
- Where one of these States has been designated for the purposes of a regional patent, the applicable time limit is 31 months
- If no demand for international preliminary examination is filed before the expiration of 19 months in respect of above States, the national phase will have to be entered before the expiration of 20 or 21 months from the priority date



PCT TIMELINE - Chapter II (for international applications filed on or after 1 January 2004)



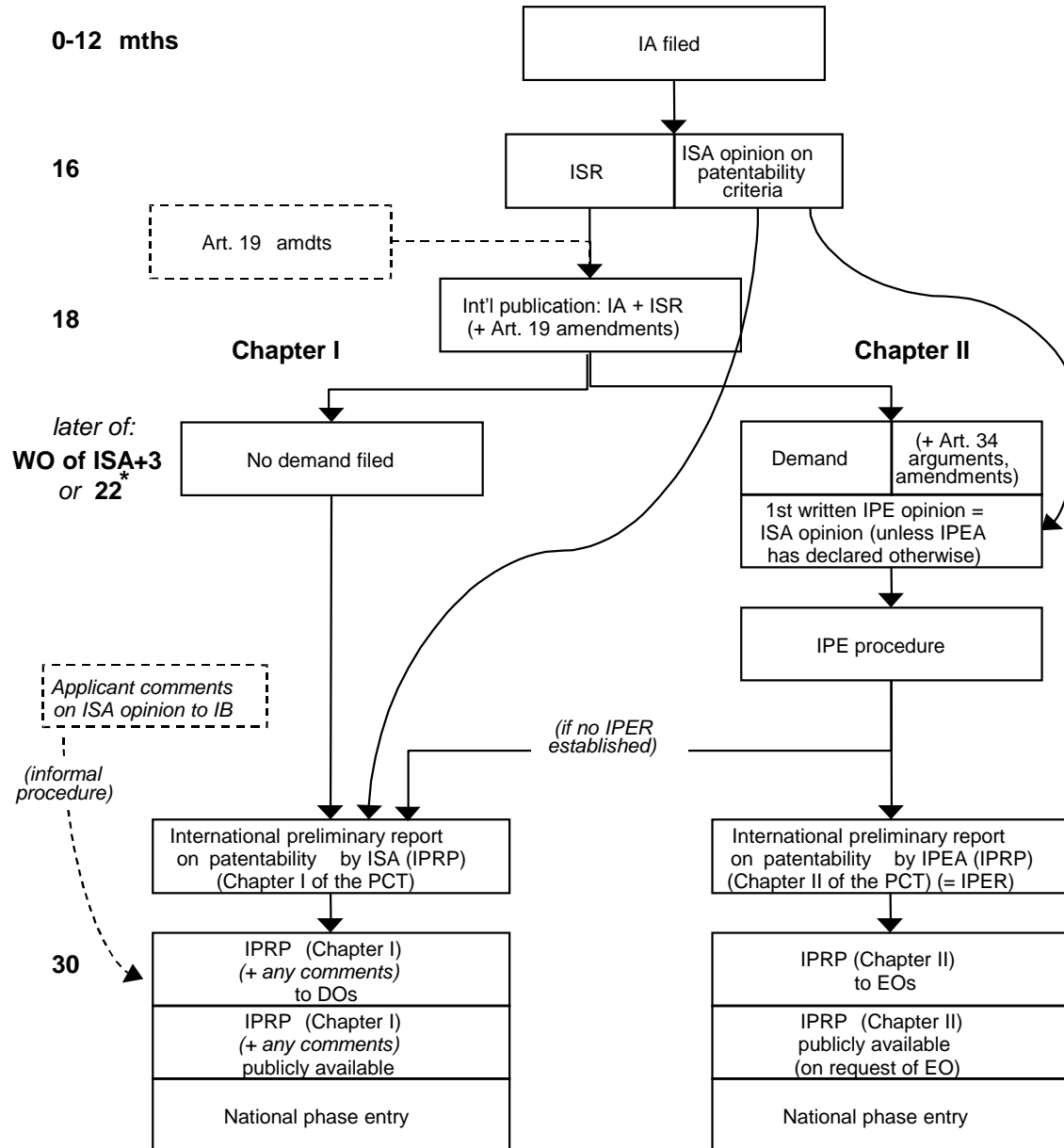
* If PCT is a first filing, the ISA will establish the ISR and WO of the ISA before the expiration of 9 months from the priority date (Rule 42.1)

** In respect of a few States, the time limit of 30 months to enter national phase will, however, only apply if those States have been elected in a demand filed before the expiration of 19 months from the priority date (for an updated list of States concerned, see the PCT's Internet site)

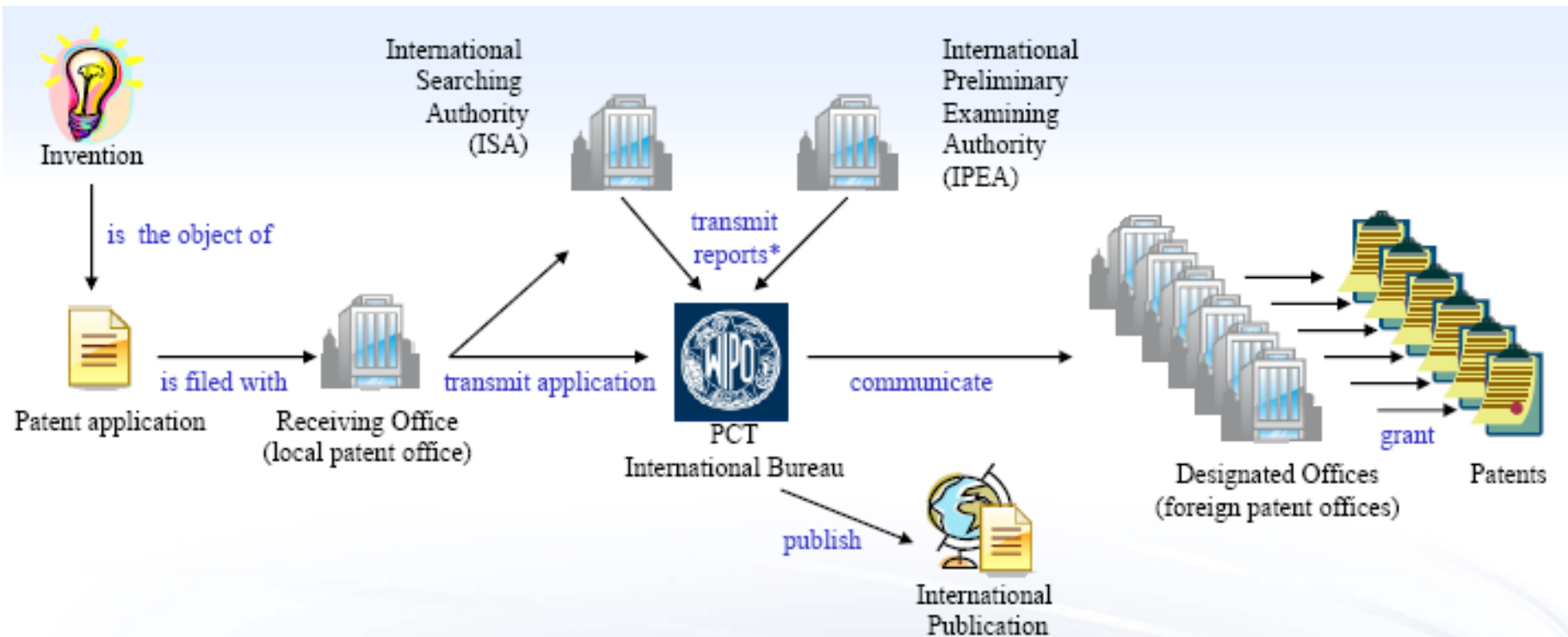
*** A demand for international preliminary examination may be filed at any time prior to the expiration of 3 months from the date of transmittal of the ISR and WO of the ISA, or 22 months from the priority date, whichever time limit expires later (Rule 54*b*.s.1(a)).



PCT System



* must in practice file demand by 19 months for Article 22 transitional reservation countries



* ISA transmit International Search Reports (ISR) & the Written Opinions / IPEA transmit International Preliminary Reports on Patentability II (IPRP II) (optional)



ISA / IPEA (17)

- the Australian Patent Office,
- the Austrian Patent Office,
- The Brazilian Patent Office
- the Canadian Patent Office,
- the China Intellectual Property Office,
- the Egyptian Patent Office,
- the European Patent Office,
- **the Indian Patent Office**
- the Israel Patent Office,
- the Japan Patent Office,
- the Korean Intellectual Property Office,
- the National Board of Patents & Registration (Finland),
- the Nordic Patent Institute,
- the Russian Patent Office,
- the Spanish Patent and Trademark Office,
- the Swedish Patent Office and
- the United States Patent and Trademark Office.

Duties of the ISA



- 1. Checks unity of invention (Rule 40)**
- 2. Checks title (Rule 37); checks abstract (Rule 38)**
- 3. Searches claimed invention (Article 15(3), Rule 33.3)**
- 4. Authorizes rectification of obvious errors if the error is:**
 - in any part of the international application other than the request or**
 - in any paper submitted to that Authority (Rule 91.1(e))**
- 5. Establishes international search report (ISR) (Rules 42 and 43) and written opinion (WO) (Rule 43*bis*) and /or declaration that no international search report will be established (Article 17(2))**



International Search Report (ISR) (Rules 42 and 43)

It contains:

- IPC (International Patent Classification) symbols**
- indications of the technical areas searched**
- indications relating to any finding of lack of unity**
- a list of the relevant prior art documents**
- indications relating to any finding that a meaningful search could not be carried out in respect of certain (but not all) claims**

Prior Art

- made available to public**
- anywhere in the world**
- by written disclosure**
- assisting in determining the claimed invention is new and involves an inventive step**
- prior to international filing date**

Written Opinion of the ISA (Rules 43*bis*)



Non binding opinion on:

- Novelty
- Inventive Step
- Industrial Applicability

Sent to the applicant with the ISR

Not published with the application

No provision of formal response

Demand not filed - IPRP established on the basis of WO of ISA

Demand Filed - WO of ISA treated as the first WO of the IPEA.

International Preliminary Examination



- 1. The purpose of the international preliminary examination is to provide a preliminary non-binding opinion on**
 - novelty (not anticipated) (Article 33(2) and Rule 64)**
 - inventive step (not obvious) (Article 33(3) and Rule 65)**
 - industrial applicability (Article 33(4))**
- 2. Relevant prior art: absolute novelty (Rule 64, see also Rule 33)**
- 3. Only claims relating to the invention(s) searched by the ISA will be examined by the IPEA (Rule 66.1(e) and 66.2(a)(vi))**
- 4. Finding of lack of unity of invention (Rule 68)**
 - same criteria as for international search (Rule 13 and Annex B of the Administrative Instructions)**
 - invitation by the IPEA to restrict the claims or to pay additional fees (which can be paid under protest)**
 - applicant can select invention as “main invention” and those inventions for which additional fees are paid**



The International Preliminary Examination Report (IPER)

IPRP

- 1. Must be established by the IPEA within:**
 - 28 months from the priority date**
 - 6 months from date of payment of fees**
 - 6 months from date of receipt by IPEA of translation under Rule 55.2, whichever expires last (Rule 69.2)**
- 2. May contain “annexes” which comprise all sheets containing amendments or rectifications (that is, rectifications of obvious errors authorized under Rule 91 by the IPEA) which have been used as a basis for the report (Rule 70.16)**
- 3. Correspondence (such as letters) or copies of amendments superseded by later amendments are not annexed to the report (Rule 70.16)**



The International Preliminary Examination Report (IPER) IPRP

- 4. No provisions for appeal or further proceedings during the international phase before the International Authorities**
- 5. Sent to the applicant and the IB (Rule 71.1)**
- 6. IB forwards copies of the report, and any required translation of the report into English (prepared by the IB), to the elected Offices (Article 36(3)(a) and Rule 72.1)**
- 7. The annexes are not translated by the IB (Article 36(3)(b))**



PCT - The Extra Edge.

- **Control Cost - Delay filing decision**
- **Growing geographical interests**
- **Finalize/develop the market**
- **Study probable competition**

COST
Filing
Issuing
#Attorney
#Maintenance

**Cost of Obtaining & Maintaining Patents in
40+ major countries is
> US\$ 500,000**



Benefits of PCT

- § **Single filing procedure for all countries**
- § **Sufficient time for translations**
- § **Drafted in accordance to PCT is valid everywhere**
- § **Flexibility of payment of fees**
- § **Advantage of maximum designation fee**
- § **Transmittal of Priority needn't be monitored**
- § **Provision for withdrawals**
- § **Quality ISR and IPRP**
- § **Provision of amendments**
- § **Last minute foreign filings**



Challenges of PCT

- § **The prosecution needs to be known**
- § **Fully time line depended**
- § **Often calls for clarifications and reminders**

Docketing should be an habit

Reference to deposited microorganisms or other biological material (Rule 13bis)



- 1. Required in a PCT application only when the national law of a designated State provides for it. Usually needed for full disclosure of the invention.**
- 2. Annex L of Volume I of the *PCT Applicant's Guide* contains the list of the designated States whose national law provides for a reference to deposited microorganisms or other biological material and indicates when and how such reference should be made.**
- 3. The reference must indicate:**
 - the name and address of the depositary institution**
 - the date of deposit of the microorganism/biological material with that institution**
 - the accession number given to the deposit by that institution**
 - any additional indication, if applicable (see Annex L)**



Reference to deposited microorganisms or other biological material (Rule 13*bis*)

- 4. The indications may be made in the description or on form PCT/RO/134.**
- 5. Certain designated Offices require that such indications be part of the description. In such a case, if form PCT/RO/134 is used, it should be numbered as a sheet of the description.**
- 6. In respect of certain designated Offices, the applicant is entitled to request that a sample be issued only to an expert nominated by the requester (a space is provided in form PCT/RO/134 to make such indication).**



IDA Status

23
Countries

39
Authorities

AU (NMI)

BE (BCCM)

BG (NBIMCC)

CA (NMLHC)

CL (CChRGM)

CN (CCTCC; CGMCC)

CZ (CCM)

DE (DSMZ)

ES (BNA; CECT)

FI (VTTCC)

FR (CNM)

IN (MTCC)

HU (NCAIM)

IT (ABC; DBVPG)

JP (IPOD; AIST)

KR (KCLRF; KCTC; KCCM)

LV (MSCL)

NL (CBS)

PL (IAFB; PCM)

RU (NRCA; VKM; VKPM)

SK (CCY)

UK (CCAP; ECACC; IMI;
NIBSC; NCTC; NCYC;
NCIMB)

US (NRRL; ATCC)

PCT Sequence Listing Standard



(Section 208 and Annex C of the AI)

1. Where the sequence listing is filed together with the international application, it:

- must be presented as a separate “Sequence Listing Part” of the description**
- must be placed at the end of the application**
- must begin on a new page**
- should preferably have independent page numbering**

2. The Standard provides further details as to:

- the symbols and the format which must be used for the presentation of nucleotide and/or amino acid sequences**
- with regard to other available information to be included in the sequence listing, the mandatory items which must, and the optional item which may, be included, and the order in which those items must appear**
- the presentation of features of sequences**
- the presentation of “free text”**



PCT Sequence Listing Standard: Presentation of free text

- 1. The Standard defines “free text” as a wording describing characteristics of the sequence which does not use “language neutral vocabulary”, that is, controlled vocabulary used in the sequence listing that represents scientific terms as prescribed by sequence database providers (including scientific names, qualifiers and their controlled vocabulary values, the symbols and the feature keys appearing in the Appendices to the Standard).**
- 2. Where the sequence listing part of the international application contains free text, that free text:**
 - may, and preferably should, be in English (irrespective of the language of the main part of the description) (Rule 12.1(d))**
 - must be repeated in the main part of the description (“Sequence Listing Free Text”) in the language thereof (ISA invites to furnish correction if not contained in main part of description as filed) (Rules 5.2(b) and 13ter.1(d))**



PCT Sequence Listing Standard: Presentation of free text

- 3. For the purposes of the national phase (Rule 49.5(a-bis)), no designated Office is entitled to require the applicant to furnish to it a translation of any text matter contained in the sequence listing part of the description if such text matter:**
- is presented in accordance with the Standard**
 - is repeated in the main part of the description (and hence in any translation thereof)**



PatentIn Software

- 1. Windows-based version (available free of charge from the JPO, the USPTO and the EPO) designed to expedite the process of preparing sequence listings in a standardized computer readable format complying with the PCT Sequence Listing Standard**
- 2. Helps in creating a database of patent-disclosed sequences**
- 3. Supports the exchange of published sequence data between the European Patent Office, the Japan Patent Office and the United States Patent and Trademark Office in a Trilateral Sequence Exchange Project**



PCT-SAFE

(Secure Applications Filed Electronically)

- Allows for preparation and submission of entire PCT international application in electronic format
- Provides safety, confidence, convenience, efficiency, wide accessibility and simplicity to PCT E-filing
- Based on agreed standards, interoperable with other user software, means for preparing an international application once and the ability to file it anywhere
- Facilitates communications and data exchange between Offices (long term)



PCT-SAFE: two options

Fully electronic filing of application:

- entire application in electronic form (image or character-coded), electronically signed
- transmitted via secure internet connection or on physical media

Preparing request in “PCT-EASY mode”

- entire application in paper form (legal copy) including the PCT-EASY request form printout
- plus physical medium with electronic request form and abstract data



PCT-SAFE: fee reductions

- “PCT-EASY” type of filing (on paper + request and abstract on physical medium)
CHF 100 (EUR 66 or equivalent amount)
- Fully electronic type of filing with application body in image format (for example PDF, TIFF attachments) and only the request in character coded format (XML)
CHF 200 (EUR 132 or equivalent amount)
- Fully electronic type of filing with application body and request in character coded format (XML)
CHF 300 (EUR 198 or equivalent amount)



ROs accepting electronic filing (1)

- RO/EP: as of 1 November 2002 (PCT-SAFE and epoline®) (PCT Gazette No. 47/2002, page 23832)
- RO/FR: as of 29 April 2003 (epoline®) (PCT Gazette No. 18/2003, page 9656)
- RO/FI: as of 1 January 2004 (PCT-SAFE and epoline®) (PCT Gazette No. 51/2003, page 29014)
- RO/KR: as of 1 January 2004 (PCT-SAFE and KEAPS) (PCT Gazette No. 51/2003, page 29020, No. 24/2004, page 13496 and No. 06/2005, page 3766)
- RO/ES: as of 15 January 2004 (PCT-SAFE and epoline®) (PCT Gazette No. 03/2004, page 1732)
- RO/IB: as of 12 February 2004 (PCT-SAFE and epoline®) (PCT Gazette No. 34/2003, page 19248 and No. 07/2004, page 3796)
- RO/JP: as of 28 April 2004 (JPO PAS); as of 4 January 2007 (also PCT-SAFE) (PCT Gazette No. 17/2004, page 9452); (PCT Gazette No. 50/2006, page 19184)
- RO/GB: as of 9 August 2004 (PCT-SAFE and epoline®) (PCT Gazette No. 32/2004, page 18092)



ROs accepting electronic filing (2)

- RO/NL: as of 24 March 2005 (PCT-SAFE and epoline®) (PCT Gazette No. 11/2005, page 7068)
- RO/DK: as of 1 September 2005 (PCT-SAFE and epoline®) (PCT Gazette No. 35/2005, page 22816)
- RO/AU: as of 15 December 2005 (PCT-SAFE and epoline®) (PCT Gazette No. 50/2005, page 33496)
- RO/SK: as of 1 January 2006 (PCT-SAFE and epoline®) (PCT Gazette No. 46/2005, page 30684)
- RO/SE: as of 1 February 2006 (PCT-SAFE and epoline®) (PCT Gazette No. 47/2005, page 31398)
- RO/PL: as of 1 March 2006 (PCT-SAFE and epoline®) (PCT Gazette No. 05/2006, page 3180)
- RO/RO: as of 2 May 2006 (PCT-SAFE and epoline®) (PCT Gazette No. 17/2006, page 12218)
- RO/PH: as of 17 July 2006 (PCT-SAFE) (PCT Gazette No. 30/2006, page 19028)



ROs accepting electronic filing (3)

- RO/DE: as of 4 October 2006 (PCT-SAFE, epoline® and PaTrAS) (PCT Gazette No. 40/2006, page 19076)
- RO/US: as of 14 October 2006 (EFS-Web) (www.uspto.gov/ebc/efs_help.html)
- RO/MY: as of 17 November 2006 (PCT-SAFE) (PCT Gazette No. 44/2006, page 19118)
- RO/CN: as of 1 May 2007 (PCT-SAFE) (Official Notices (PCT Gazette) – 19 April 2007, page 67)
- RO/CA: as of 29 September 2008 (PCT-SAFE) (Official Notices (PCT Gazette) – 4 September 2008, page 115)
- RO/IS: as of 1 March 2010 (PCT-SAFE) (Official Notices (PCT Gazette) – 11 February 2010, page 46)

List of the PCT fees and to whom they must be paid

(Fees indicated in italics are payable only in certain circumstances)



To the RO:

- transmittal fee
- international filing fee**
- search fee*
- supplement per sheet in excess of 30**
- fee for priority document
- late payment fee
- late furnishing fee (translation of international application)
- fee for copies of documents

To the IB:

- special fee for publication of request for rectification of obvious error
- special fee for publication of information concerning priority claim considered not to have been made
- fee for early publication (before issuance of ISR)
- fee for copies of documents

To the ISA:

- additional search fee
- protest fee (only ISA/CN, ISA/EP and ISA/KR)
- fee for copies of documents
- late furnishing fee (furnishing of a sequence listing)

To the IPEA:

- preliminary examination fee
- handling fee***
- late payment fee
- additional examination fee
- protest fee (only IPEA/CN, IPEA/EP and IPEA/KR)
- fee for copies of documents
- late furnishing fee (furnishing of a sequence listing)

* collected by RO for ISA

** collected by RO for IB

*** collected by IPEA for IB



Cost Considerations

EXAMPLE OF PCT FEES TO BE PAID BY CORPORATE APPLICANTS FROM INDIA

– Transmittal fee:	US\$	104 (RO/IB)	INR 17600 (RO/IN)
– International Filing fee:	US\$	1384	
– Less PCT-SAFE (Max.):	US \$	(312)	
– Less 75% redn.	US\$	0	
– Search fee:	US\$.	1040	(ISA=US)
– Examination fee:	US\$	300	(IPEA=US)
– Handling fee:	US\$	208	
<hr/>			
TOTAL PCT FEE (Ch.I):	US\$	2216	INR 17600 (RO/IN)
TOTAL PCT FEE (Ch.II):	US\$	2724	



Benefits from using the PCT: A unique procedure

- 1. One application, in one language, filed with one Office, replaces multiple foreign filings until entry into the national phase**
- 2. Permits last minute foreign filing (before expiration of priority year)**
- 3. International filing date has the effect of national filing date in all designated Offices**
- 4. Uniform formal requirements accepted by all designated Offices**
- 5. Greater home control of the prosecution**
- 6. Decision on foreign filings can be postponed up to 30 months from the priority date at minimal cost**
- 7. Enables assessment of economic value of the invention and the chances of obtaining a patent before entering national phase**



Benefits from using the PCT: greater flexibility

- 1. Keep options open by making multiple designations**
- 2. Various possibilities for withdrawal**
- 3. International publication can be prevented or postponed until as late as 15 days before the actual publication date – conditional withdrawal possible**
- 4. Further expenses can be avoided simply by no longer prosecuting the application or not entering the national phase**
- 5. Amendments made during the international phase have effect in all designated/elected States**
- 6. More time for better quality translation for the national phase**
- 7. Better planning of the expenditures for the national phase**



Benefits from using the PCT: further features

- 1. Postponing national filings costs earns interest on capital**
- 2. Fee reductions in national phase in certain national Offices**
- 3. More straightforward and rapid national patent granting**
- 4. Less restrictive unity of invention requirements permit a reduced number of applications in the US**
- 5. Provisional protection after publication at 18 months from the priority date (in countries which afford such protection)**
- 6. 75% reduction in PCT fees for applicants from certain Contracting States**



Evolution of the practice

- ◆ **Carefully comply with all formal requirements**
- ◆ **Select ISA and IPEA for maximum benefits**
- ◆ **Reserve all market options - designate all**
- ◆ **Docket & track all events**
- ◆ **File early Demands**
- ◆ **Respond to Written Opinions**
- ◆ **Integrate PCT into Portfolio Management Program**
- ◆ **Make final decisions using all information**
- ◆ **Allow your agents sufficient time**

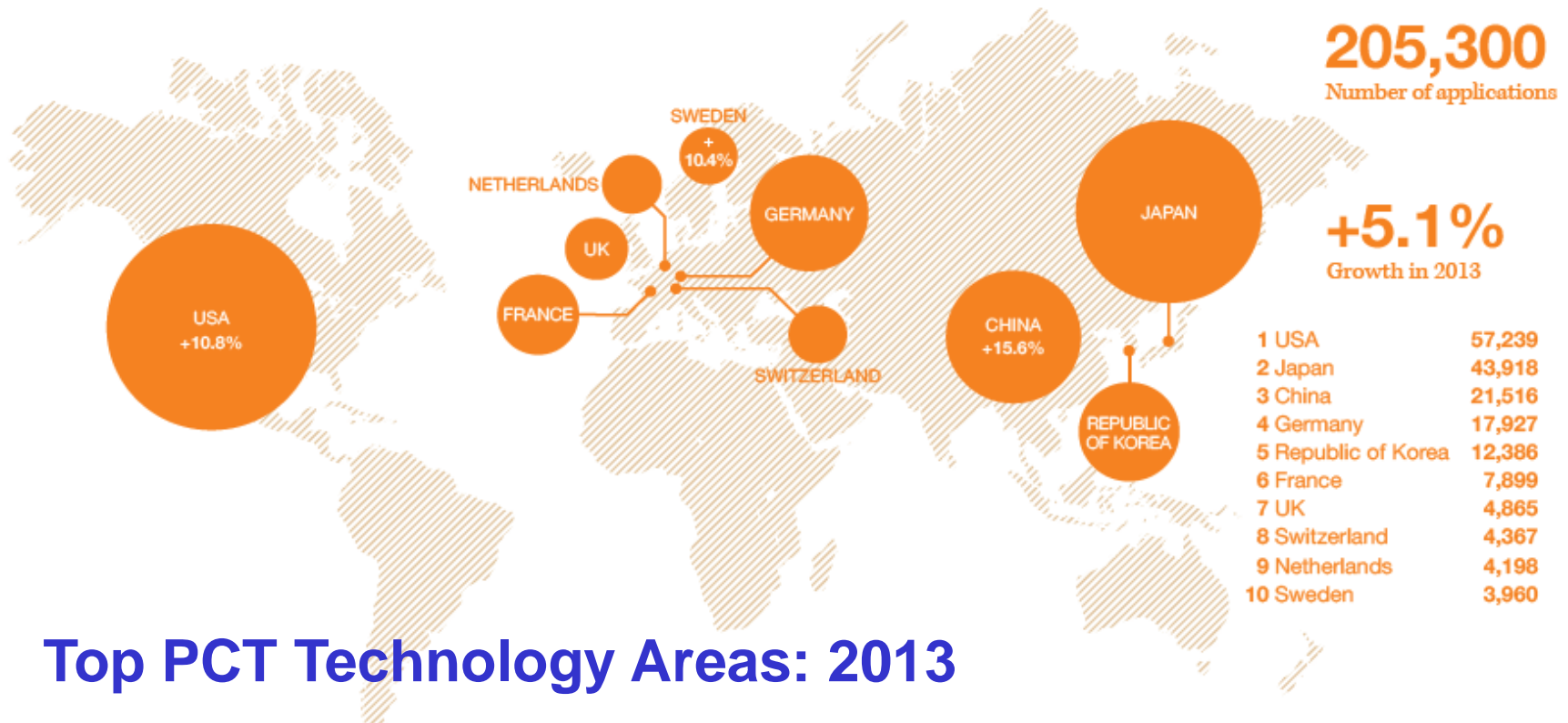


Decisions -

- 1) Is filing a PCT application right?**
- 2) Where is the market of the invention?**
- 3) Who are the customers?**
- 4) Who is the competition?**
- 5) How easy (or difficult) would it be to design around the claims?**
- 6) Is there an incentive to copy in unprotected countries?**
- 7) What is the marketing strategy?**
- 8) What is important - exclusivity, freedom to practice or both?**
- 9) What is your budget?**

Top PCT Applying Countries: 2013

TOP 10 COUNTRIES



Top PCT Technology Areas: 2013

TOP 5 TECHNOLOGIES



Top 25 PCT Applicants (Corporates) - 2014



Overall rank	Changed position from 2013	Applicants	Origin	Applications	Change from 2013
1	2	HUAWEI TECHNOLOGIES CO., LTD.	China	3,442	1,332
2	2	QUALCOMM INCORPORATED	United States of America	2,409	351
3	-1	ZTE CORPORATION	China	2,179	-130
4	-3	PANASONIC CORPORATION	Japan	1,682	-1,157
5	7	mitsubishi electric corporation	Japan	1,593	280
6	-1	INTEL CORPORATION	United States of America	1,539	-332
7	2	TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)	Sweden	1,512	44
8	12	MICROSOFT CORPORATION	United States of America	1,460	652
9	2	SIEMENS AKTIENGESELLSCHAFT	Germany	1,399	51
10	0	KONINKLIJKE PHILIPS ELECTRONICS N.V.	Netherlands	1,391	-32
11	2	SAMSUNG ELECTRONICS CO., LTD.	Republic of Korea	1,381	183
12	-4	TOYOTA JIDOSHA KABUSHIKI KAISHA	Japan	1,378	-320
13	-6	ROBERT BOSCH CORPORATION	Germany	1,371	-438
14	-8	SHARP KABUSHIKI KAISHA	Japan	1,227	-612
15	-1	NEC CORPORATION	Japan	1,215	26
16	-1	LG ELECTRONICS INC.	Republic of Korea	1,138	-40
17	36	TENCENT TECHNOLOGY (SHENZHEN) COMPANY LIMITED	China	1,086	727
18	-2	FUJIFILM CORPORATION	Japan	1,072	69
19	31	UNITED TECHNOLOGIES CORPORATION	United States of America	1,013	643
20	-1	HITACHI, LTD.	Japan	996	141
21	-4	SONY CORPORATION	Japan	982	66
22	5	GOOGLE INC.	United States of America	914	284
23	-6	SHENZHEN CHINA STAR OPTOELECTRONICS TECHNOLOGY CO., LTD	China	904	-12
24	13	KABUSHIKI KAISHA TOSHIBA	Japan	856	412
25	-3	HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.	United States of America	826	52

Top 25 PCT Applicants (Universities) - 2014



Overall rank	Changed position from 2013	Applicants	Origin	Applications	Change from 2013
47	-4	UNIVERSITY OF CALIFORNIA	United States of America	413	15
83	12	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	United States of America	234	15
132	38	UNIVERSITY OF TEXAS SYSTEM	United States of America	154	35
145	19	HARVARD UNIVERSITY	United States of America	147	26
163	14	JOHNS HOPKINS UNIVERSITY	United States of America	135	19
201	11	LELAND STANFORD JUNIOR UNIVERSITY	United States of America	113	12
206	-59	COLUMBIA UNIVERSITY	United States of America	112	-21
225	10	CALIFORNIA INSTITUTE OF TECHNOLOGY	United States of America	103	12
249	54	UNIVERSITY OF PENNSYLVANIA	United States of America	94	22
253	16	SEOUL NATIONAL UNIVERSITY	Republic of Korea	92	12
275	-51	CORNELL UNIVERSITY	United States of America	87	-8
290	-2	NANYANG TECHNOLOGICAL UNIVERSITY	Singapore	82	7
293	-50	UNIVERSITY OF FLORIDA	United States of America	81	-8
293	69	KYOTO UNIVERSITY	Japan	81	23
293	150	DANMARKS TEKNISKE UNIVERSITET	Denmark	81	33
304	-18	UNIVERSITY OF TOKYO	Japan	79	3
305	2	UNIVERSITY OF MICHIGAN	United States of America	78	7
312	54	KOREA UNIVERSITY	Republic of Korea	77	20
314	-33	PEKING UNIVERSITY	China	76	-1
325	77	UNIVERSITY OF WASHINGTON	United States of America	74	21
325	-39	ISIS INNOVATION LIMITED	United Kingdom	74	-2
332	79	KYUSHU UNIVERSITY	Japan	72	20
336	17	TSINGHUA UNIVERSITY	China	70	10
347	-143	KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY	Republic of Korea	67	-37
378	33	OSAKA UNIVERSITY	Japan	62	10

Top 25 PCT Applicants (Govt. / Research Institutes) - 2013



Overall rank	Changed position from 2013	Applicants	Origin	Applications	Change from 2013
45	-5	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	France	434	15
63	21	FRAUNHOFER-GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Germany	318	70
107	-15	CHINA ACADEMY OF TELECOMMUNICATIONS TECHNOLOGY	China	196	-31
130	10	INSTITUTE OF MICROELECTRONICS OF CHINESE ACADEMY OF SCIENCES	China	156	17
136	76	AGENCY OF SCIENCE, TECHNOLOGY AND RESEARCH	Singapore	152	51
139	-21	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)	France	150	-15
161	23	INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE (INSERM)	France	136	22
191	73	MIMOS BERHAD	Malaysia	119	37
192	43	COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH	India	117	26
198	45	NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY	Japan	114	25
262	53	CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (CSIC)	Spain	90	22
290	-66	U.S.A., AS REPRESENTED BY THE SECRETARY DEPT. OF HEALTH AND HUMAN SERVICES	United States of America	82	-13
293	69	KOREA INSTITUTE OF ENERGY RESEARCH	Republic of Korea	81	23
352	39	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWETENSCHAPPELIJK ONDERZOEK TNO	Netherlands	66	12
374	-41	KOREA INSTITUTE OF INDUSTRIAL TECHNOLOGY	Republic of Korea	63	-1
378	13	KOREA ELECTRONICS TECHNOLOGY INSTITUTE	Republic of Korea	62	8
385	17	BATTELLE MEMORIAL INSTITUTE	United States of America	60	7
422	-20	JAPAN SCIENCE AND TECHNOLOGY AGENCY	Japan	55	2
422	-168	ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE OF KOREA	Republic of Korea	55	-32
437	73	CLEVELAND CLINIC FOUNDATION	United States of America	53	12
488	195	SLOAN-KETTERING INSTITUTE FOR CANCER RESEARCH	United States of America	48	18
501	139	KOREA RESEARCH INSTITUTE OF CHEMICAL TECHNOLOGY	Republic of Korea	47	15
538	-147	MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN E.V.	Germany	43	-11
550	71	UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF THE NAVY	United States of America	42	9
608	-197	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION	Australia	38	-14



-1-



LOW TEMPERATURE SYNTHESIS OF VITREOUS
BODIES AND THEIR INTERMEDIATES

FIELD OF THE INVENTION

This invention relates to a novel method for making a
5 vitreous body and its intermediates. More particularly, the
method relates to a low temperature production of a vitreous body
via synthesis of a self-supporting body by solution deposition.

DESCRIPTION OF THE PRIOR ART

In recent years, the most commonly employed commercial
10 process for the manufacture of glass is the direct melting
process. This process is somewhat tedious and has not been very
successful in the melting of easily devitrifiable and high refrac-
tory glass. Many of the latest technological advances demand
glass to be in a state of high purity which is seldom met in a



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : D01D 5/42, F16J 15/22, D01F 6/12</p>	<p>A1</p>	<p>(11) International Publication Number: WO 99/60191</p> <p>(43) International Publication Date: 25 November 1999 (25.11.99)</p>
<p>(21) International Application Number: PCT/IN98/00001</p> <p>(22) International Filing Date: 29 December 1998 (29.12.98)</p> <p>(30) Priority Data: 318/Bom/98 20 May 1998 (20.05.98) IN</p> <p>(71)(72) Applicant and Inventor: PANDEY, Raj, Kumar [IN/IN]; Plot No. A/465, Road No. 28, Wagle Industrial Estate, Thane 400 604, Mumbai, Maharashtra (IN).</p> <p>(74) Agent: BHATNAGAR, Mahendra, Prasad; Lall Lahiri & Salhotra, N-128, Panchsheel Park, New Delhi 110 017 (IN).</p>		<p>(81) Designated States: US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i> <i>With amended claims and statement.</i></p>
<p>(54) Title: EXPANDED SINGLE MOLECULAR ALIGNED TEMPERATURE TREATED YARN</p>		

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