

PATENT ASSIGNMENT COVER SHEET

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 Stylesheet Version v1.2

EPAS ID: PAT4936323

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
TECHNOLOGICAL RESOURCES PTY. LIMITED	10/16/2017
RECEIVING PARTY DATA	
Name:	TATA STEEL LIMITED
Street Address:	24 HOMI MODY STREET
Internal Address:	FORT
City:	MUMBAI
State/Country:	INDIA
Postal Code:	400 001
PROPERTY NUMBERS Total: 1	
Property Type	Number
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ATTORNEY DOCKET NUMBER:	007221.00024
NAME OF SUBMITTER:	SUSAN A. WOLFFE
SIGNATURE:	/Susan A. Wolffe/
DATE SIGNED:	04/27/2018
Total Attachments: 38	
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झारखण्ड JHARKHAND

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This Non-Judicial Stamp Paper of Rs 100/- forms part and parcel of the Deed of Assignment – Registered Intellectual Property (For the assignment of certain registered intellectual property rights from Technological Resources Pty. Limited to Tata Steel Ltd.) entered between Tata Steel Ltd. and Technological Resources Pty. Limited executed on 16 October 2017

Tata Steel Ltd.

Technological Resources Pty. Limited


(Authorised Signatory) T.V. NARENDHAN


(Authorised Signatory)


(AUTHORISED SIGNATORY)

ALAN SMITH
K OUSHIK CHATTERJEE

4.227 3.40
Serial No. Date of Sale
Stamp Value Rs. 100/- Sold to
Receipt No.
Total Value of Stamps Purchased to Rs. 100/-



Shyam Sunder Prasad
SHYAM SUNDER PRASAD
Govt. Stamp Vendor
Jamshedpur Court (Jharkhand State)
Licence No.-2/A.B.C.(1987-88)

Technological Resources Pty. Limited
and
Tata Steel Limited

Deed of Assignment - Registered Intellectual Property

For the assignment of certain registered intellectual property rights from Technological Resources Pty. Limited to
Tata Steel Limited

Execution Version

The Allens contact for this document is Richard Hamer



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This Deed is made on 16 October 2017

Parties

- 1 **Technological Resources Pty. Limited** (ACN 002 183 557) of 120 Collins Street, Melbourne, Victoria, Australia (the **Assignor**)
- 2 **Tata Steel Limited** (CIN: L27100MH1907PLC000260) of Bombay House, 24 Homi Mody Street, Fort, Mumbai 400 001 (the **Assignee**)

Recitals

- A. The Assignor is the registered proprietor of the Trade Mark Registrations.
- B. The Assignor is the applicant seeking registration of (in respect of the Common Applications and the Hisarna Applications), or the proprietor of, the Patents.
- C. The Assignor has agreed, pursuant to a head agreement entered into between the Assignor and the Assignee on or around the date of this Deed (the "**Head Agreement**") to assign to the Assignee:
 - (a) all of the Assignor's right, title and interest in and to the Trade Marks (including the Trade Mark Registrations), together with all goodwill of the business in relation to which such Trade Marks are used (but no other or greater goodwill); and
 - (b) the Assignor's entire right, title and interest in and to the Patents,in accordance with the terms and conditions of this Deed.

It is agreed as follows.

1 Definitions and Interpretation

1.1 Definitions

The following definitions apply unless the context requires otherwise:

Business Days has the meaning given in the Head Agreement.

Common Patents means (collectively) the pending patent applications (including any registrations arising in relation to them) (the "**Common Applications**") and the registered patents, listed in Schedule 1.

Contract IP Encumbrances has the meaning given to that term in the agreement between the parties entitled 'Tata Head Agreement', dated on or around the date of this Deed.

Effective Date means the date of this Deed.

Goods means, in respect of a given Trade Mark, the goods which are, as at the Effective Date, the subject of any Trade Mark Registration for that Trade Mark.

Hisarna Patents means (collectively) the pending patent applications (including any registrations arising in relation to them) (the "**Hisarna Applications**") and the registered patents, listed in Schedule 2.

Patents means, collectively, the Common Patents and the Hisarna Patents.



Services means, in respect of a given Trade Mark, the services which are, as at the Effective Date, the subject of any Trade Mark Registration for that Trade Mark.

trade mark has the meaning given to that term in section 1 of the *Trade Marks Act 1994* (UK).

Trade Marks means HISARNA and HICOOLER and the device mark shown in Schedule 3.

Trade Mark Registrations means the trade mark registrations listed in Schedule 3.

Transaction Documents has the meaning given in the Head Agreement.

Warranties means the representations and warranties contained in clause 3.1.

Works means any literary and/or artistic works comprised or embodied in the Trade Marks.

1.2 Interpretation

- (a) Headings are for convenience only and do not affect interpretation.
- (b) Mentioning anything after *includes*, *including*, *for example*, or similar expressions, does not limit what else might be included.
- (c) Nothing in this Deed is to be interpreted against a party solely on the ground that the party put forward this Deed or a relevant part of it.
- (d) The following rules apply unless the context requires otherwise.
 - (i) The singular includes the plural, and the converse also applies.
 - (ii) A gender includes all genders.
 - (iii) If a word or phrase is defined, its other grammatical forms have a corresponding meaning.
 - (iv) A reference to a *person* includes a corporation, trust, partnership, unincorporated body or other entity, whether or not it comprises a separate legal entity.
 - (v) A reference to a clause, or schedule is a reference to a clause of, or a schedule to, this Deed.
 - (vi) A reference to an agreement or document (including a reference to this Deed) is to the agreement or document as amended, supplemented, novated or replaced, except to the extent prohibited by this Deed or that other agreement or document.
 - (vii) A reference to a party to this Deed or another agreement or document includes the party's successors, permitted substitutes and permitted assigns (and, where applicable, the party's legal personal representatives).
 - (viii) A reference to legislation (including delegated legislation) or to a provision thereof includes a modification or re-enactment of it, a legislative provision substituted for it and a regulation or statutory instrument issued under it, as the case may be.
 - (ix) A reference to conduct includes an omission, statement or undertaking, whether or not in writing.



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- (x) A reference to an *agreement* includes any undertaking, deed, agreement and legally enforceable arrangement, whether or not in writing, and a reference to a *document* includes an agreement (as so defined) in writing and any certificate, notice, instrument and document of any kind.

2 Assignment

2.1 Assignment of Registrations

With effect from the Effective Date, Assignor assigns to Assignee:

- (a) the right to be noted in the relevant trade mark registry as the owner of the Trade Mark Registrations;
- (b) all of the Assignor's right, title and interest in and to the Trade Marks, including the Trade Mark Registrations (including in any copyright in the Works), but excluding moral rights, and similar personal rights, which by law are non-assignable;
- (c) all of the Assignor's common law rights pertaining to the Assignor's trade in relation to which the Trade Marks have been used by the Assignor or its licensees, including the particular Goods and Services; and
- (d) all its right to institute and maintain proceedings for, and recover damages in respect of, infringement against any person who before, on or after the date of this Deed infringes rights given by any registration arising in relation to the Trade Mark Registrations.

2.2 Assignment of the Patents

With effect from the Effective Date, Assignor assigns to Assignee all its right, title and interest, including all its rights, privileges and advantages relating to them, in the Patents, to hold unto the Assignee absolutely for the full term of the Patents, including:

- (a) the right to prosecute and obtain registration of:
 - (i) the Common Applications; and
 - (ii) the Hlsama Applications;
- (b) the right to change the address for service for any of the Patents;
- (c) the right to apply for, prosecute and obtain patents or like protection throughout the world in respect of any inventions which are embodied in any of the Patents including the right to claim priority for any of the Patents; and
- (d) all its right to institute and maintain proceedings for, and recover damages in respect of, infringement against any person who before, on or after the date of this Deed infringes rights given by any registration arising in relation to the Patents.

3 No Warranties

3.1 Representations and Warranties

The Assignor represents and warrants to the Assignee that, except as expressly disclosed in this Deed or agreed by the Assignee:

- (a) The Assignor is:
 - (i) the registered proprietor of the Trade Mark Registrations and Patents;

- (ii) the sole legal owner of all common law and other rights attaching to the Trade Marks (including the copyright in the Works) in respect of the Goods and Services, but excluding moral rights, and similar personal rights, which by law are non-assignable, and any right to claim (and retain) damages and other remedies in relation to those non-assignable personal rights; and
- (b) the Assignor has not entered into any agreement or arrangement involving the sale, mortgage, pledge, granting of options or any other rights over the Assignor's interest in any of the Trade Mark Registrations or Patents, other than the Contract IP Encumbrances.

3.2 Date of Effect

Each of the Warranties is given only as at the Effective Date.

3.3 Implied Warranties

All warranties and conditions which would otherwise be implied in this Deed are excluded to the maximum extent permitted by law and the Assignee acknowledges and agrees that neither the Assignor, nor any person acting on its behalf, has made any representation or given any warranty in relation to the Trade Marks, the Trade Mark Registrations (including any representation or warranty as to whether the Assignee's use of any of the Trade Marks would infringe the rights of any third person), or the Patents, other than the Warranties and the warranties given in Schedule 1 of the Head Agreement in accordance with the terms of the Head Agreement.

4 Notices

Any notice, demand, consent or other communication (a "Notice") given or made under this Deed:

- (a) must be in writing and signed by the sender or a person duly authorised by the sender (or in the case of email, set out the full name and position or title of the sender or person duly authorised by the sender);
- (b) must be delivered to the intended recipient by prepaid post (if posted to an address in another country, by registered airmail) or by hand, fax or email to the address, fax number or email address below or the address, fax number or email address last notified by the intended recipient to the sender:
 - (i) to the Assignor: Attention: Rio Tinto Intellectual Property group
Legal & Regulatory, Rio Tinto
Address: 152-158 St Georges Terrace
Perth, Western Australia, 6000
Fax No: +618 93272720
Email: Rebecca.McCrackan@riotinto.com
& Australian IP Inbox IP@riotinto.com
 - (ii) to the Assignee: Address: Tata Steel Limited, Bombay House, 24 Homi
Mody Street, Fort, Mumbai 400 001
Fax No: 022-6665-7724
Email: cosec@tatasteel.com

Attention: Group General Counsel

- (c) will be conclusively taken to be duly given or made and received:
- (i) in the case of delivery in person, when delivered;
 - (ii) in the case of delivery by express post, to an address in the same country, two Business Days after the date of posting;
 - (iii) in the case of delivery by any other method of post, six Business Days after the date of posting (if posted to an address in the same country) or 10 Business Days after the date of posting (if posted to an address in another country);
 - (iv) in the case of fax, on receipt by the sender of a transmission control report from the despatching machine showing the relevant number of pages and the correct destination fax number or name of recipient and indicating that the transmission has been made without error; and
 - (v) in the case of email, at the earliest of:
 - (A) the time that the sender receives an automated message from the intended recipient's information system confirming delivery of the email;
 - (B) the time that the intended recipient confirms receipt of the email by reply email; and
 - (C) three hours after the time the email is sent (as recorded on the device from which the sender sent the email) unless the sender receives, within that three hour period, an automated message that the email has not been delivered,
- but if the result is that a Notice would be taken to be given or made and received:
- (vi) in the case of delivery by hand, post or fax, at a time that is later than 5pm;
 - (vii) in the case of delivery by email, at a time that is later than 7pm; or
 - (viii) on a day that is not a Business Day,
- in the place specified by the intended recipient as its postal address under sub-clause (b), it will be conclusively taken to have been duly given or made and received at the start of business on the next Business Day in that place.

5 Amendment

This Deed may be amended only by another agreement executed by all the parties.

6 Assignment

The rights and obligations of each party under this Deed are personal. They cannot be assigned, encumbered or otherwise dealt with and no party must attempt, or purport, to do so without the prior written consent of all parties.

7 No Waiver

A failure to exercise or a delay in exercising any right, power or remedy under this Deed does not operate as a waiver. A single or partial exercise or waiver of the exercise of any



right, power or remedy does not preclude any other or further exercise of that or any other right, power or remedy. A waiver is not valid or binding on the party granting that waiver unless made in writing.

8 Further Assurances

The Assignor must at the request of the Assignee, do anything necessary so as to give full effect to this Deed including:

- (a) executing further deeds and/or assignment documents to enable the recordal of the assignments of the Patents and Trade Mark Registrations at the relevant registry;
- (b) executing all documents, forms and authorisations and depose to or swear any declaration or oath as may be reasonably required for absolutely vesting all its right, title and interest in and to the Trade Marks and the Patents in the Assignee;
- (c) executing all documents, forms and authorisations and depose to or swear any declaration or oath as may be reasonably required for procuring the registration of the Common Applications and/or the Hlsarna Applications; and
- (d) rendering to the Assignee such reasonable assistance as may be reasonably necessary in any proceedings involving any of the Patents and the Trade Marks (including the Trade Mark Registrations).

9 No Merger

The rights and obligations of the parties will not merge on the completion of any transaction contemplated by this Deed. They will survive the execution and delivery of any assignment or other document entered into for the purpose of implementing a transaction.

10 Severability of Provisions

Any provision of this Deed that is prohibited or unenforceable in any jurisdiction is ineffective as to that jurisdiction to the extent of the prohibition or unenforceability. That does not invalidate the remaining provisions of this Deed nor affect the validity or enforceability of that provision in any other jurisdiction.

11 Costs and Duty

Each party must bear its own costs arising out of the negotiation, preparation, performance and execution of this Deed. All stamp duty (and any fines, penalties or interest thereon) payable on or in connection with this Deed and any instrument executed under this Deed must be borne by the Assignee. The Assignee must indemnify the Assignor on demand against any liability for that duty (including without limitation any amounts paid by the Assignor on account of that duty) or any payment made by the Assignor in respect of duty.

12 Governing Law and Jurisdiction

This Deed is governed by English law. In relation to it and related non-contractual matters each party irrevocably submits to the non-exclusive jurisdiction of courts with jurisdiction there, and waives any right to object to the venue on any ground.

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13 Counterparts

This Deed may be executed in any number of counterparts. All counterparts together will be taken to constitute one instrument.

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Schedule 1 - Common Patents

Common Patents – Solids Injection Lance

Hismelt ref: P116

Patent family description: *Apparatus for Injecting Solid Particulate Material into a Vessel*

Earliest priority: 28 January 2000

App. Number*/Patent no.	Filing Date	Country
2332724	26 January 2001	Canada
172847	23 January 2001	China (People's Republic)
5004380	26 January 2001	Japan
10-0767877	29 January 2001	Korea, Republic of
6398842	16 January 2001	United States of America

Hismelt ref: P123

Patent family description: *Apparatus for Injecting Solid Particulate Material into a Vessel*

Earliest priority: 30 May 2000

App. Number*/Patent no.	Filing Date	Country
2001261907	29 May 2001	Australia
2409474	29 May 2001	Canada
ZL01810194.1	29 May 2001	China (People's Republic)
201674	29 May 2001	India
5313426	29 May 2001	Japan
10-0841023	29 May 2001	Korea, Republic of
255965	29 May 2001	Mexico
MY-134762-A	29 May 2001	Malaysia
2271397	29 May 2001	Russian Federation
28094	29 May 2001	Thailand
193904	29 May 2001	Taiwan
6565800	29 May 2001	United States of America
2002/8642	29 May 2001	South Africa

Hismelt ref: P190

Patent family description: *Solids Injection Lance (Solid Lance with Outer Sheath)*

Earliest priority: 27 July 2004

App. Number*/Patent no.	Filing Date	Country
2005203306	27 July 2005	Australia

PI0503061-7	27 July 2005	Brazil
2513193	27 July 2005	Canada
ZL200510087637.X	27 July 2005	China (People's Republic)
05016224.7*	27 July 2005	European Patent Convention
254381	27 July 2005	India
5322370	27 July 2005	Japan
10-1269447	27 July 2005	Korea, Republic of
289656	27 July 2005	Mexico
301155	27 July 2005	Mexico
541460	27 July 2005	New Zealand
2395772	27 July 2005	Russian Federation
I390042	27 July 2005	Taiwan
7445747	27 July 2005	United States of America
8003044	27 July 2005	United States of America
2005/06043	27 July 2005	South Africa

Hismelt ref: P261

Patent family description: *Lance for Injecting Solid Particulate Material into a Vessel*

Earliest priority: 19 June 2007

App. Number*/Patent no.	Filing Date	Country
2008265507	19 June 2008	Australia
200880102171	19 June 2008	China (People's Republic)
112008001693.3*	19 June 2008	Germany
8353/DELNP/2009*	19 June 2008	India
8613790	19 June 2008	United States of America

Hismelt ref: P220

Patent family description: *Direct Smelting Vessel and Cooler Therefore (Slag Zone Cooler)*

Earliest priority: 18 May 2006

App. Number*/Patent no.	Filing Date	Country
2007252293	18 May 2007	Australia
PI0711913-5	18 May 2007	Brazil
2652236	18 May 2007	Canada
200780026213	18 May 2007	China (People's Republic)
602007023920.6	18 May 2007	Germany
2038434	18 May 2007	France

10397/DELNP/2008*	18 May 2007	India
5415940	18 May 2007	Japan
10-1349229	18 May 2007	Korea, Republic of
2038434	18 May 2007	Netherlands
573600	18 May 2007	New Zealand
14353	18 May 2007	African Intellectual Property
014890	18 May 2007	Russian Federation
2038434	18 May 2007	Sweden
TR201210815T4	18 May 2007	Turkey
8221675	18 May 2007	United States of America
14998	18 May 2007	Vietnam

Hlsmeit ref: IR7951

Patent family description: *Puncture Detection for Solid Injection Lance Liner (Puncture detection system)*

Earliest priority: 6 May 2013

App. Number*/Patent no.	Filing Date	Country
BR112015027789-6*	02 May 2014	Brazil
2910743*	02 May 2014	Canada
201480031481.0*	02 May 2014	China (People's Republic)
201591999*	02 May 2014	Eurasian Patent Organization
14794616.4*	02 May 2014	European Patent Convention
P00201508003*	02 May 2014	Indonesia
6854/CHENP/2015*	02 May 2014	India
2016-512166*	02 May 2014	Japan
2015-7033343*	02 May 2014	Korea, Republic of
5715*	02 May 2014	Mongolia
713633*	02 May 2014	New Zealand
A201510515*	02 May 2014	Ukraine
14/889018*	02 May 2014	United States of America
1-2015-04321*	02 May 2014	Vietnam

Hlsmeit ref: IR7952

Patent family description: *A Solids Injecting Lance (Concentric injection of coal in acceleration spool)*

Earliest priority: 16 May 2013



PATENT

App. Number*/Patent no.	Filing Date	Country
BR112015028423-0*	02 May 2014	Brazil
2910537*	02 May 2014	Canada
201480027025.9*	02 May 2014	China (People's Republic)
201592088*	02 May 2014	Eurasian Patent Organization
14798282.1*	02 May 2014	European Patent Convention
6904/CHENP/2015*	02 May 2014	India
P00 2015 08489*	02 May 2014	Indonesia
2016-513175*	02 May 2014	Japan
2015-7033957*	02 May 2014	Korea, Republic of
5728*	02 May 2014	Mongolia
713550*	02 May 2014	New Zealand
A201510516*	02 May 2014	Ukraine
14/891112*	02 May 2014	United States of America
1-2015-04287*	02 May 2014	Vietnam

Common Patents – Plant

Hismelt ref: P94

Patent family description: *Direct Smelting Vessel and Direct Smelting Process (Water Cooled Panels)*

Earliest priority: 01 July 1998

App. Number*/Patent no.	Filing Date	Country
PI9911635-9	01 July 1999	Brazil
ZL99807442.X	01 July 1999	China (People's Republic)
ID0012713	01 July 1999	Indonesia
203331	01 July 1999	India
2221051	01 July 1999	Russian Federation
2000/6408	01 July 1999	South Africa

Hismelt ref: P95

Patent family description: *Direct Smelting Vessel and Direct Smelting Process (High Slag Inventory)*

Earliest priority: 01 July 1998

App. Number*/Patent no.	Filing Date	Country
ZL99807946.4	01 July 1999	China (People's Republic)
301945	01 July 1999	Czech Republic
1098997	01 July 1999	Finland
ID0014943	01 July 1999	Indonesia
201470	01 July 1999	India
10-0707916	01 July 1999	Korea, Republic of
244995	01 July 1999	Mexico
MY-125804-A	01 July 1999	Malaysia
1098997	01 July 1999	Netherlands
2226219	01 July 1999	Russian Federation
28095	01 July 1999	Thailand
151853	01 July 1999	Taiwan

Hismelt ref: P107

Patent family description: *Direct Smelting Vessel (Off-Gas Duct)*

Earliest priority: 08 June 1999

App. Number*/Patent no.	Filing Date	Country
PI0003471-1	08 June 2000	Brazil
00120302.9	08 June 2000	China (People's Republic)

PATENT

REEL: 046344 FRAME: 0560

ID0013040	08 June 2000	Indonesia
203357	08 June 2000	India
2253680	08 June 2000	Russian Federation
2000/2857	08 June 2000	South Africa

Hismelt ref: P108

Patent family description: *Start-Up Procedure for Direct Smelting Process*

Earliest priority: 09 July 1999

App. Number*/Patent no.	Filing Date	Country
PI0003469-0	10 July 2000	Brazil
ZL00120449.1	10 July 2000	China (People's Republic)
ID0015889	10 July 2000	Indonesia
201104	10 July 2000	India
4916046	10 July 2000	Japan
10-0647232	10 July 2000	Korea, Republic of
2242520	10 July 2000	Russian Federation
36213	10 July 2000	Thailand
177570	10 July 2000	Taiwan
6517605	10 July 2000	United States of America
2000/3263	10 July 2000	South Africa

Hismelt ref: P109

Patent family description: *Pressure Control*

Earliest priority: 10 August 1999

App. Number*/Patent no.	Filing Date	Country
PI0003486-0	10 August 2000	Brazil
2315502	10 August 2000	Canada
ZL00128985.3	10 August 2000	China (People's Republic)
ID0015920	10 August 2000	Indonesia
203249	10 August 2000	India
4550977	10 August 2000	Japan
2258743	10 August 2000	Russia

Hismelt ref: P112

Patent family description: *Stable Idle Procedure*

Earliest priority: 15 October 1999

App. Number*/Patent no.	Filing Date	Country
ZL00133865.X	15 October 2000	China (People's Republic)

Hismelt ref: P113

Patent family description: *A Direct Smelting Process (Bath Derived Gas Rate)*

Earliest priority: 27 September 1999

App. Number*/Patent no.	Filing Date	Country
ZL00133862.5	26 September 2000	China (People's Republic)
0017168	26 September 2000	Indonesia
199320	26 September 2000	India
4790109	26 September 2000	Japan
224639	26 September 2000	Mexico
MY-127453-A	26 September 2000	Malaysia
507157	26 September 2000	New Zealand
36702	26 September 2000	Thailand
179158	26 September 2000	Taiwan
6428603	26 September 2000	United States of America

Hismelt ref: P121

Patent family description: *A Direct Smelting Process and Apparatus (Solids Injection)*

Earliest priority: 17 April 2000

App. Number*/Patent no.	Filing Date	Country
2001248156	11 April 2001	Australia
PI0110108-0	11 April 2001	Brazil
2405966	11 April 2001	Canada
ZL01809524.0	11 April 2001	China (People's Republic)
1276912	11 April 2001	United Kingdom
ID0014859	11 April 2001	Indonesia
257731	11 April 2001	India
5112593	11 April 2001	Japan
10-0764042	11 April 2001	Korea, Republic of
241437	11 April 2001	Mexico
2258744	11 April 2001	Russian Federation
TR200705611T4	11 April 2001	Turkey
177529	11 April 2001	Taiwan
6989042	11 April 2001	United States of America
6510	11 April 2001	Vietnam
2002/8389	11 April 2001	South Africa

Hismelt ref: P125Patent family description: *A direct smelting vessel (Slag zone cooler)*

Earliest priority: 25 October 2000

App. Number*/Patent no.	Filing Date	Country
783471	22 October 2001	Australia
ZL02108098.4	24 February 2002	China (People's Republic)

Hismelt ref: P153Patent family description: *Recycle of Steelmaking Slag to a Direct Smelting Process (Slag Recycling)*

Earliest priority: 30 January 2004

App. Number*/Patent no.	Filing Date	Country
2005209334	31 January 2005	Australia
ZL200580007541.6	31 January 2005	China (People's Republic)
255483	31 January 2005	India
5132155	31 January 2005	Japan
10-1173908	31 January 2005	Korea, Republic of
2372407	31 January 2005	Russian Federation
85217	31 January 2005	Ukraine
7935172	31 January 2005	United States of America
8298317	31 January 2005	United States of America


Hismelt ref: P158Patent family description: *Supplying solid feed materials for a direct smelting process (Separate coal feed to Vessel)*

Earliest priority: 12 October 2004

App. Number*/Patent no.	Filing Date	Country
AR051214B1	12 October 2005	Argentina
ZL200510124941.7	12 October 2005	China (People's Republic)
259437	13 October 2005	India
IDP000037923	12 October 2005	Indonesia
5000880	12 October 2005	Japan
274025	11 October 2005	Mexico
2418862	12 October 2005	Russian Federation
7494615	12 October 2005	United States of America

Hismelt ref: P162Patent family description: *Smelting Apparatus (Lance Removal)*

Earliest priority: 27 July 2004



App. Number*/Patent no.	Filing Date	Country
PI0513815-9*	27 July 2005	Brazil
200580031829.7	27 July 2005	China (People's Republic)
ID P 0025899 B	27 July 2005	Indonesia
10-1253729	27 July 2005	Korea, Republic of
TR200700466B	27 July 2005	Turkey
I373529	27 July 2005	Taiwan
87860	27 July 2005	Ukraine
8211357	27 July 2005	United States of America
10339	27 July 2005	Vietnam

Hismelt ref: P168

Patent family description: *Metallurgical Vessel (Water Cooled Panels)*

Earliest priority: 04 February 2004

App. Number*/Patent no.	Filing Date	Country
AR047874B1	03 February 2005	Argentina
2005210677	03 February 2005	Australia
PI0507472-0*	03 February 2005	Brazil
2555300	03 February 2005	Canada
ZL200580004161.7	03 February 2005	China (People's Republic)
IDP0022962	03 February 2005	Indonesia
266681	03 February 2005	India
4989974	03 February 2005	Japan
10-1173897	03 February 2005	Korea, Republic of
295700	03 February 2005	Mexico
MY-144669-A	03 February 2005	Malaysia
2365629	03 February 2005	Russian Federation
I353384	03 February 2005	Taiwan
8038932	03 February 2005	United States of America
2006/06302	03 February 2005	South Africa

Hismelt ref: P182

Patent family description: *Apparatus for Injecting Solid Particulate Material into a Vessel (Lance Outer Sleeve Mounting)*

Earliest priority: 27 July 2004

App. Number*/Patent no.	Filing Date	Country
1797204	27 July 2005	Austria

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2575098	27 July 2005	Canada
ZL200580031828.2	27 July 2005	China (People's Republic)
1797204	27 July 2005	Czech Republic
1797204	27 July 2005	Germany
1797204	27 July 2005	Spain
1797204	27 July 2005	France
745/DELNP/2007*	27 July 2005	India
1797204	27 July 2005	Italy
5008559	27 July 2005	Japan
10-1186484	27 July 2005	Korea, Republic of
009964	27 July 2005	Kazakhstan
1797204	27 July 2005	Netherlands
1797204	27 July 2005	Poland
009964	27 July 2005	Russian Federation
1797204	27 July 2005	Sweden
90482	27 July 2005	Ukraine
7722800	27 July 2005	United States of America

Hismelt ref: P193

Patent family description: *Hot Metal Supply Apparatus (Hot metal II – Apparatus)*

Earliest priority: 18 April 2005

App. Number*/Patent no.	Filing Date	Country
ZL200680020841.2	18 April 2006	China (People's Republic)
8047/DELNP/2007*	18 April 2006	India
93373	18 April 2006	Ukraine

Hismelt ref: P201

Patent family description: *Forehearth (Forehearth Connection)*

Earliest priority: 26 April 2005

App. Number*/Patent no.	Filing Date	Country
200680020536.3*	26 April 2006	China (People's Republic)
201110074472	26 April 2006	China (People's Republic)
4125/KOLNP/2007*	26 April 2006	India
2402616	26 April 2006	Russian Federation
TR 2011 12429 T4	26 April 2006	Turkey
93506	26 April 2006	Ukraine

7828873

26 April 2006

United States of America

Hismelt ref: P216a

Patent family description: *Direct Smelting Plant (Multi-HAB)*

Earliest priority: 01 March 2006

App. Number*/Patent no.	Filing Date	Country
PI0708475-7	01 March 2007	Brazil
ZL200780015609.4	01 March 2007	China (People's Republic)
IDP000038780	01 March 2007	Indonesia
281163	01 March 2007	India
5248333	01 March 2007	Japan
10-1349238	01 March 2007	Korea, Republic of
296346	01 March 2007	Mexico
MY-146512-A	01 March 2007	Malaysia
2431680	01 March 2007	Russian Federation
2004866	01 March 2007	Turkey
91412	01 March 2007	Ukraine
8318081	01 March 2007	United States of America
11378	01 March 2007	Vietnam
2008/07435	01 March 2007	South Africa

Hismelt ref: P285

Patent family description: *A Direct Smelting Process and Apparatus*

Earliest priority: 09 February 2009

App. Number*/Patent no.	Filing Date	Country
2010210313	09 February 2010	Australia
ZL 201080014207.4	09 February 2010	China (People's Republic)
W-00201103209*	09 February 2010	Indonesia
6215/DELNP/2011*	09 February 2010	India
105921	09 February 2010	Ukraine
9175907	09 February 2010	United States of America
14/867116*	28 September 2015	United States of America

Hismelt ref: P366

Patent family description: *Smelting Metal Oxides (Titano- Magnetite Smelting)*

Earliest priority: 18 May 2010

App. Number*/Patent no.	Filing Date	Country
2011256134	18 May 2011	Australia

2016253642*	18 May 2011	Australia
BR 11 2012 029016 9*	18 May 2011	Brazil
2799056*	18 May 2011	Canada
ZL201180024820.9	18 May 2011	China (People's Republic)
201410483567.9*	19 September 2014	China (People's Republic)
11782769.1	18 May 2011	European Patent Convention
IDP000040014	18 May 2011	Indonesia
P-00201506300*	7 October 2015	Indonesia
9874/DELNP/2012*	18 May 2011	India
5774092	18 May 2011	Japan
10-2012-7030692*	18 May 2011	Korea, Republic of
327564	18 May 2011	Mexico
MX/a/2014/010986*	12 September 2014	Mexico
2573849	18 May 2011	Russian Federation
110617	18 May 2011	Ukraine
a 2015 00070*	5 January 2015	Ukraine
13/698475*	18 May 2011	United States of America
15/365026*	18 May 2011	United States of America
IAP20120492*	18 May 2011	Uzbekistan
1-2012-03721*	18 May 2011	Vietnam
2012/09473	18 May 2011	South Africa

Hismelt ref: P375

Patent family description: *Direct Smelting Process (Slag Chemistry Control)*

Earliest priority: 15 September 2010

App. Number*/Patent no.	Filing Date	Country
2011301784	15 September 2011	Australia
1120130061308*	15 September 2011	Brazil
2811123*	15 September 2011	Canada
ZL201180044656.8	15 September 2011	China (People's Republic)
11824363.3*	15 September 2011	European Patent Convention
W-00201301566*	15 September 2011	Indonesia
2338/DELNP/2013*	15 September 2011	India
5877838	15 September 2011	Japan

10-2013-7009586*	15 September 2011	Korea, Republic of
2591925	15 September 2011	Russian Federation
111829	15 September 2011	Ukraine
13/823308*	15 September 2011	United States of America
IAP 2013 0146*	15 September 2011	Uzbekistan
1-2013-01138*	15 September 2011	Vietnam

Hismelt ref: P380

Patent family description: *Direct Smelting Process (Injection Parameters)*

Earliest priority: 09 February 2011

App. Number*/Patent no.	Filing Date	Country
2012214112	09 February 2012	Australia
112013015528-0*	09 February 2012	Brazil
2826469*	09 February 2012	Canada
12744399.2*	09 February 2012	European Patent Convention
W00 2013 02929*	09 February 2012	Indonesia
3639/CHENP/2013*	09 February 2012	India
5963212	09 February 2012	Japan
10-2013-7023673*	09 February 2012	Korea, Republic of
610180*	09 February 2012	New Zealand
2591929	09 February 2012	Russian Federation
0112849	09 February 2012	Ukraine
9359656	09 February 2012	United States of America
IAP 2013 0367*	09 February 2012	Uzbekistan
1-2013-01598*	09 February 2012	Vietnam

Hismelt ref: IR7867

Patent family description: *Starting a Smelting Process (SRV Start-up Heat Flux Management)*

Earliest priority: 25 July 2012

App. Number*/Patent no.	Filing Date	Country
2013296127*	18 July 2013	Australia
BR 11 2015 000912 3*	18 July 2013	Brazil
2877318*	18 July 2013	Canada
201380037515.2*	18 July 2013	China (People's Republic)

2014292231*	18 July 2013	Eurasian Patent Organization
13823393.7*	18 July 2013	European Patent Convention
P00 2015 01070*	18 July 2013	Indonesia
9074/CHENP/2014*	18 July 2013	India
2015-523342*	18 July 2013	Japan
2015-7003803*	18 July 2013	Korea, Republic of
4330	18 July 2013	Mongolia
702432*	18 July 2013	New Zealand
A 2014 13612*	18 July 2013	Ukraine
14/416378*	18 July 2013	United States of America
IAP 2014 0534*	18 July 2013	Uzbekistan
1-2014-04291*	18 July 2013	Vietnam

Hismelt ref: IR8021

Patent family description: *Smelting Process and Apparatus (Hicooler)*

Earliest priority: 06 December 2013

App. Number*/Patent no.	Filing Date	Country
2014360665*	04 December 2014	Australia
2,931,735*	04 December 2014	Canada
1314-2016*	04 December 2014	Chile
201480066102.1*	04 December 2014	China (People's Republic)
14866843.7*	04 December 2014	European Patent Convention
P00 2016 04277*	04 December 2014	Indonesia
201647023030*	04 December 2014	India
MX/a/2016/007248*	04 December 2014	Mexico
PI 2016001016*	04 December 2014	Malaysia
720457*	04 December 2014	New Zealand
1-2016-501037*	04 December 2014	Philippines
2016124760*	04 December 2014	Russian Federation
516371250*	04 December 2014	Saudi Arabia

15/039456*	04 December 2014	United States of America
2016/04357*	04 December 2014	South Africa

Hismelt ref: IR8089

Patent family description: **Method of Sealing and Repairing a Refractory Tap Hole (Slag Drain Wear Management)**

Earliest priority: 23 December 2014

App. Number*/Patent no.	Filing Date	Country
2015372430*	14 December 2015	Australia
TBA*	14 December 2015	Canada
201580076519.0*	14 December 2015	China (People's Republic)
15871343.8*	14 December 2015	European Patent Convention
PID 2017 04856*	14 December 2015	Indonesia
201747025738*	14 December 2015	India
1-2017-501187*	14 December 2015	Philippines
2017123472*	14 December 2015	Russian Federation
15/538452*	14 December 2015	United States of America
2017/04919*	14 December 2015	South Africa

Hismelt ref: IR8022

Patent family description: **On-Wind Drilling**

Earliest priority: 17 February 2015

App. Number*/Patent no.	Filing Date	Country
2016222275*	TBA	Australia
TBA	TBA	Canada
TBA	TBA	China (People's Republic)
TBA	TBA	European Patent Convention
PID201706102	TBA	Indonesia
TBA	TBA	India
TBA	TBA	Philippines
2017130544	TBA	Russian Federation
15/551526	TBA	United States of America
TBA	TBA	South Africa

Hismelt ref: IR8088

Patent family description: **Slag Notch (Steel Lined Slag Notch)**

Earliest priority: 14 April 2015



App. Number*/Patent no.	Filing Date	Country
PCT/AU2016/050274*	14 April 2016	Patent Cooperation Treaty

Hismelt ref: IR8135

Patent family description: *Steam Snorkel*

Earliest priority: 02 May 2016

App. Number*/Patent no.	Filing Date	Country
PCT/AU2017/050400*	02 May 2017	Patent Cooperation Treaty

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Schedule 2 - Hisarna Patents

Hismelt ref: P395

Patent family description: *Direct Smelting Process for High Sulphur Feed*

Earliest priority: 21 March 2011

App. Number*/Patent no.	Filing Date	Country
201280014787.6*	21 March 2012	China (People's Republic)
12759895.1*	21 March 2012	European Patent Convention
W00 2013 004840*	21 March 2012	Indonesia
3000/KOLNP/2013*	21 March 2012	India
5946201	21 March 2012	Japan
10-2013-7027534*	21 March 2012	Korea, Republic of
5161*	21 March 2012	Mongolia
2600290	21 March 2012	Russian Federation

Hismelt ref: IR7775

Patent family description: *Process Start-Up (Hot)*

Earliest priority: 06 December 2011

App. Number*/Patent no.	Filing Date	Country
2012350150	06 December 2012	Australia
BR112014013493-6*	06 December 2012	Brazil
2857681*	06 December 2012	Canada
ZL 201280066948.6	06 December 2012	China (People's Republic)
12856259.2*	06 December 2012	European Patent Convention
P00 2014 03743*	06 December 2012	Indonesia
4192/CHENP/2014*	06 December 2012	India
2014-545039*	06 December 2012	Japan
10-2014-7018659*	06 December 2012	Korea, Republic of
626934*	06 December 2012	New Zealand
2014124756*	06 December 2012	Russian Federation
0113296	06 December 2012	Ukraine

9551044	06 December 2012	United States of America
IAP 2014 0272*	06 December 2012	Uzbekistan
1-2014-02020*	06 December 2012	Vietnam

Hismelt ref: IR7776

Patent family description: **Cold Re-Start**

Earliest priority: 06 December 2011

App. Number*/Patent no.	Filing Date	Country
2012350144	06 December 2012	Australia
BR112014013548-7*	06 December 2012	Brazil
2858176*	06 December 2012	Canada
ZL201280067285.X	06 December 2012	China (People's Republic)
12856182.6*	06 December 2012	European Patent Convention
P00 2014 03744*	06 December 2012	Indonesia
4231/CHENP/2014*	06 December 2012	India
2014-545036	06 December 2012	Japan
10-2014-7018687*	06 December 2012	Korea, Republic of
626931	06 December 2012	New Zealand
2014124754*	06 December 2012	Russian Federation
0113295	06 December 2012	Ukraine
9458518	06 December 2012	United States of America
IAP 2014 0271*	06 December 2012	Uzbekistan
1-2014-02024*	06 December 2012	Vietnam

Hismelt ref: IR7780

Patent family description: **Hot Forehearth Cleaning**

Earliest priority: 06 December 2011

App. Number*/Patent no.	Filing Date	Country
2012350151	06 December 2012	Australia



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BR112014013563-0*	06 December 2012	Brazil
2857684*	06 December 2012	Canada
ZL201280065780.7	06 December 2012	China (People's Republic)
12855037.3	06 December 2012	European Patent Convention
P00 2014 43745*	06 December 2012	Indonesia
4194/CHENP/2014*	06 December 2012	India
2014-545040*	06 December 2012	Japan
10-2014-7018676*	06 December 2012	Korea, Republic of
5355*	06 December 2012	Mongolia
626933	06 December 2012	New Zealand
2014124752*	06 December 2012	Russian Federation
0112562	06 December 2012	Ukraine
9309579	06 December 2012	United States of America
IAP 2014 0273*	06 December 2012	Uzbekistan
1-2014-02021*	06 December 2012	Vietnam

Hismelt Ref: IR8024

Patent family description: *Dogleg Off-Gas Hood*

Earliest priority: 20 December 2013

App. Number*/Patent no.	Filing Date	Country
2014366893*	20 December 2014	Australia
201480068445.1*	20 December 2014	China (People's Republic)
14871825.7*	20 December 2014	European Patent Convention
P00 2016 04712*	20 December 2014	Indonesia
201647024756*	20 December 2014	India
PI 2016001150*	20 December 2014	Malaysia
1-2016-501167*	20 December 2014	Philippines
15/104348*	20 December 2014	United States of America
1-2016-02619*	20 December 2014	Vietnam

2016/04978*

20 December 2014

South Africa

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Schedule 3 - Trade Mark Registrations

HISARNA word mark

Country	Trade Mark Registration Number	Trade Mark Goods and Services Class	Next renewal date
Australia	1371711	<p>Class 6: Metals and metal alloys, particularly iron and steel</p> <p>Class 11: Furnaces; apparatus for supplying feed materials to furnaces; injection lances for furnaces; water cooled panels for furnaces; apparatus for processing off gases produced in furnaces; apparatus for pretreating feed materials for furnaces; and apparatus for handling molten material produced in furnaces</p> <p>Class 37: Services being the construction and maintenance of a plant to reduce metal oxides, particularly iron oxides</p> <p>Class 42: Services being engineering of a plant to reduce metal oxides, particularly iron oxides</p>	13/07/2020
China	9041305	Class 11: Furnaces; Apparatus for supplying feed materials to furnaces; Water cooled panels for furnaces; Apparatus for processing off gases produced in furnaces; Apparatus for handling molten material produced in furnaces.	20/02/2022
	9041308	Class 6: Metals and metal alloys, particularly iron and steel	20/01/2022
European Union	009 637 554	<p>Class 6: Metals and metal alloys, particularly iron and steel</p> <p>Class 11: Furnaces; apparatus for supplying feed materials to furnaces; injection lances for furnaces; water cooled panels for furnaces; apparatus for processing off gases produced in furnaces;</p>	4/01/2021

Country	Trade Mark Registration Number	Trade Mark Goods and Services Class	Next renewal date
		apparatus for pretreating feed materials for furnaces; and apparatus for handling molten material produced in furnaces	
India	2079938	Class 6: Metals and metal alloys, particularly iron and steel Class 11: Furnaces; apparatus for supplying feed materials to furnaces; injection lances for furnaces; water cooled panels for furnaces; apparatus for processing off gases produced in furnaces; apparatus for pretreating feed materials for furnaces; and apparatus for handling molten material produced in furnaces	03/01/2021
United States of America	4117048	Class: 6 Metals and metal alloys, particularly iron and steel Class: 11 Furnaces; apparatus for supplying feed materials to furnaces; injection lances for furnaces; water cooled panels for furnaces; apparatus for processing off gases produced in furnaces; apparatus for pretreating feed materials for furnaces; and apparatus for handling molten material produced in furnaces	27/03/2022




HI COOLER design mark

Country	Trade Mark Registration Number	Trade Mark Goods and Services Class	Next renewal date
Australia	1634822	Class 7: Industrial machines for water cooling of metallurgical reactors for ore smelting	8/04/2024
Canada	1,672,100 (pending)	Industrial water cooling machines for use in metallurgical reactors for smelting of ore	
China	1 208 886	Class 7: Industrial machines for water cooling of metallurgical reactors for ore smelting	8/04/2024
European Union	012 753 059	Class 7: Industrial water cooling machines for use in metallurgical reactors for smelting of ore	2/04/2024
France	14 4 080 840	Class 7: Industrial water cooling machines for use in metallurgical reactors for smelting of ore	2/04/2024
India	1 208 886 (International designation still pending)	Class 7: industrial water cooling machines for use in metallurgical reactors for smelting of ore	n/a
Russia	1 208 886	Class 7: Industrial machines for water cooling of metallurgical reactors for ore smelting	2/04/2024
South Africa	2014/16211 application number (pending)	Class 11: industrial water cooling machines for use in metallurgical reactors for smelting of ore	n/a
Ukraine	1 208 886	Class 7: Industrial machines for water cooling of metallurgical reactors for ore smelting	2/04/2024
United States of America	86/247462 application number (pending)	Class 11: industrial water cooling machines for use in metallurgical reactors for smelting of ore	n/a

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PATENT**REEL: 046344 FRAME: 0578**

Country	Trade Mark Registration Number	Trade Mark Goods and Services Class	Next renewal date
Uzbekistan	1 208 886	Class 7: Industrial machines for water cooling of metallurgical reactors for ore smelting	2/04/2024

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Authorised signatory

being persons who, in accordance with the
laws of that territory, are acting under the
authority of the company.

Executed as a deed on behalf of **Tata
Steel Limited**, a company incorporated
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T.V. NARENDRA

KOUSHIK CHATTERJEE

being persons who, in accordance with
the laws of that territory, are acting
under the authority of the company.

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Authorised signatory

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Authorised signatory

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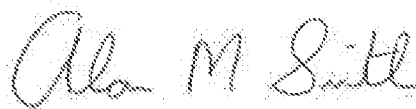
Signed, sealed and delivered for and on
behalf of **Technological Resources Pty.
Limited** in the presence of:



Signature of Witness

NICHOLAS SCALES

Name of Witness



Signature of Authorised Signatory

ALAN MURRAY SMITH

Name of Authorised Signatory

