

TUNGSTEN



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60th Edition

TUNGSTEN

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**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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18 Tungsten

Tungsten, also known as 'wolfram' is a very dense lustrous greyish white to steel-grey metal. It is inherently brittle therefore making it that much more difficult to work with. Tungsten is a metal of strategic importance and is essential for the industrial development of the country. Tungsten does not occur naturally as free metal. The major sources of tungsten are minerals scheelite (Calcium tungstate, CaWO_4) and Wolframite [mixture of ferrous tungstate and manganous tungstate, $(\text{Fe}, \text{Mn})\text{WO}_4$] which are predominantly hydrothermal in origin. Tungsten has a melting point of $3,422^\circ\text{C}$, the highest of all metals and is resistant to all acids at ordinary temperatures. It has good corrosion resistance, good thermal & electrical conductivity and low co-efficient of expansion. It is elastic, ductile and has high tensile strength and can be drawn into very thin wires. Tungsten is considered the most important metal for thermo-emission applications not only because of its high electron emissivity but also because of its high thermal and chemical stability. As tungsten has extremely high melting point and is ductile, it is widely used in filaments of light bulbs and vacuum tubes, and for heating elements in electrical furnaces.

When exposed to air, a protective oxide is formed on the surface of the metal, but tungsten can be oxidised more fully at high temperature. When alloyed in small quantities with steel, tungsten greatly increases the hardness of steel.

The domestic requirements of tungsten and its products are met mainly through imports. A significant amount of tungsten is recovered through recycling of tungsten and its alloys including waste & scrap.

RESERVES/RESOURCES

The total resources of tungsten ore in the country, as per NMI data, as on 1.04.2020 based on UNFC system, has been estimated at 89.43 million tonnes with WO_3 content of 1,44,650 tonnes. All these resources are placed under 'Remaining Resources' category.

Resources of tungsten-bearing minerals are mainly distributed in Karnataka (41%), Rajasthan (27%), Andhra Pradesh (17%) and Maharashtra (11%). The remaining 4% resources are in Haryana, Tamil Nadu, Uttarakhand and West Bengal (Table- 1). Incidences

of WO_3 in tungsten ore have been reported from different areas of the country. At Degana, Rajasthan, in a total of 7 blocks, the minimum and maximum values of WO_3 noticed were 0.09% and 1.62%, respectively. At Balda of Sirohi district, Rajasthan, the average WO_3 content was found to range from 0.24 to 0.48 per cent. In Dewa-Ka-Bera of Sirohi district, the average WO_3 is 0.03% and in Udwarya of Sirohi, it is 0.27%. In West Bengal, Bankura deposit contains an average of 0.1% WO_3 . In Kuhi-Khobana-Agargaon belt of Maharashtra, GSI has estimated resources in Sakoli basin in the district of Bhandara and Nagpur. The analysis showed 0.01 to 0.19% WO_3 in Kuhi block, 0.13 to 0.38% WO_3 in Khobana block and 0.48% WO_3 in Pardi-Dahegaon-Pipalgaon block. Gold ore at Mysore mine of BGML in Karnataka has been reckoned as a potential source of scheelite. The tailing dumps at Kolar Gold Fields (as per NMI database) contain about 0.01 to 0.05% WO_3 .

EXPLORATION & DEVELOPMENT

The details on exploration and development, if any, are covered in the Review on Exploration & Development under "General Reviews".

PRODUCTION & PRICES

There was no reported production of tungsten ore/concentrate during 2020-21. In the past, production of tungsten was reported from Degana in Rajasthan and Chendapathar in West Bengal. The domestic prices of tungsten ore and concentrate are furnished in the General Review on 'Prices'.

MINING & PROCESSING

Deposits of wolframite that were established at Degana in Rajasthan and at Chendapathar in West Bengal are found associated with quartz veins, with width that varied from a few centimetres to three metres or sometimes even more. In Degana, it is also associated with gravel beds overlain by 2.5 m thick sand.

Gravel mining was carried out in the past in selected areas where wolframite was found to be concentrated. The overburden sand was at first loosened and loaded manually and transported by tractor unit to dump sites. The payable gravel was then worked.

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Table -1 : Reserves/Resources of Tungsten as on 1.4.2020 (P)
(By Grades/States)

Grade/State	Reserve Total (A)	Remaining Resources							Total Resources (A+B)
		Feasibility STD211	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India : Total									
Ore	0	2230000	173063	23276152	23259954	23912049	16581246	89432464	89432464
Contained WO ₃	0	3568	450	19298.8	16994.84	99772.15	4566.28	144650.1	144650.1
By States									
Andhra Pradesh									
Ore	0	0	0	3640000	4700800	5952500	509000	14802300	14802300
Contained WO ₃	0	0	0	5096	6574.64	8273.65	318.28	20262.57	20262.57
Haryana									
Ore	0	2230000	0	0	0	0	0	2230000	2230000
Contained WO ₃	0	3568	0	0	0	0	0	3568	3568
Karnataka									
Ore	0	0	0	15361152	11805499	172921	9338246	36677818	36677818
Contained WO ₃	0	0	0	2915	1775	142	1403	6235	6235
Maharashtra									
Ore	0	0	0	4275000	5461250	386000	0	10122250	10122250
Contained WO ₃	0	0	0	11287.8	7117.92	185	0	18590.72	18590.72
Rajasthan									
Ore	0	0	0	0	963666	17000628	5964000	23928294	23928294
Contained WO ₃	0	0	0	0	1421.44	90171.5	2115	93707.94	93707.94
Tamil Nadu									
Ore	0	0	0	0	0	0	250000	250000	250000
Contained WO ₃	0	0	0	0	0	0	50	50	50
Uttarakhand									
Ore	0	0	0	0	138000	0	520000	658000	658000
Contained WO ₃	0	0	0	0	25	0	680	705	705
West Bengal									
Ore	0	0	173063	0	190739	400000	0	763802	763802
Contained WO ₃	0	0	450	0	80.84	1000	0	1530.84	1530.84

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In case of vein deposits, the orebody was cut with chisel and hammer at convenient places to form undercuts. At Degana, tungsten orebody occurs as vein, stockwork and alluvial deposits. Inclined veins were developed by putting adits in the stockwork.

Degana in Rajasthan and Chendapathar in West Bengal were the only mines of tungsten in India that had produced meagre quantities of concentrate. These mines, owing to economic non-viability, had to be closed down.

As per Annual Report of NMDC for 2020-21, the Company has submitted a proposal for reservation of Khobna Tungsten Block, Nagpur District, Maharashtra under Section 17(A) (2A) of MM (D&R) Amendment Act, 2015, for tungsten prospecting and exploitation.

The matter is being pursued with Govt. of Maharashtra. NMDC has a majority stake of 90.05% in Legacy Iron Ore Limited, an ASX listed entity based in Perth, Australia which has iron ore (magnetite), gold, nickel, base metal and tungsten interests (total 21 tenements) in Western Australia.

USES

Tungsten is mainly used in the form of ferro-tungsten in making of special and alloy steels and military applications. Ferrotungsten typically contains between 25% and 75% tungsten. The other principal use of tungsten is in the manufacture of tungsten carbide, one of the hardest synthetic materials used in various industries like construction, metalworking, mining and oil drilling. It is used widely in the manufacture of cutting tools & devices and in wear-resistant materials, particularly those that need to be operated at high temperatures. In making this, cobalt or nickel metal powder is used as a binder to hold together the tungsten carbide grains.

Tungsten compounds are used in dyes and pigments; manufacture of paints & printing ink; and also in Ceramic Industry for producing yellow tint. Other alloys bearing tungsten have wide range of applications, i.e., ornaments, heat sinks, radiation shielding, weights & counter-weights, superalloys for turbine parts, tool steels wear-resistant alloy parts & coatings, etc.

Tungsten alloys and tungsten composites are used as a substitute for lead in bullet and shot. Tungsten is used as filament in incandescent light

bulbs and cathodes for electronic tubes, cell phones, television set, HID lamps and other electrical consumer products. The metal is used in superalloys with copper or silver and in Chemical Industry. Tungsten carbide is often used in armor-piercing ammunition.

SUBSTITUTES

Tungsten remains essentially unsubstitutable in its use for production of filaments, electrodes and contacts in lamp & lighting applications. However, an electrodeless, non-tungsten lamp is available as alternative for commercial and industrial uses. Titanium, tantalum and niobium carbides can be used in certain wear-resistant applications. Molybdenum tool steels and tungsten tool steels are interchangeable. In some cutting tool applications, bulk ceramic is an alternative. In some applications, substitution would most often result in increased cost or reduction in product performance.

TECHNICAL POSSIBILITIES

Further development of new metal shaping methods, i.e., laser is becoming a viable proposition. Development of new cutting tool materials coating on cemented carbide parts, that increase their useful life could reduce the usage of tungsten. There is increase in the use of tungsten scrap. The recycling of tungsten-bearing scrap and the recovery of tungsten from scrap materials are well-established practices for a number of reasons. The value of tungsten and other metals present in the scrap, such as, cobalt, columbium, copper, nickel, rhenium, silver, titanium and tantalum, is worthy enough reason to recycle them from scrap. Recycling of tungsten in high speed steel is high and a typical melt contains about 60-70% of the metal scrap, including from that of internally generated scrap. On the other hand, recycling in such applications as lamp filaments, welding electrodes and chemicals uses is also considered viable. Recycling is more environment-friendly and more practicable in economic terms than disposing as waste. Scrap recycling is an important factor in the world's tungsten supply.

POLICY

As per the Foreign Trade Policy, 2015-20, the imports and exports of tungsten ores and

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concentrates (HS Code 26110000) are allowed free.

CONSUMPTION

The entire domestic requirement of tungsten ore/concentrates is met by imports. Sandvik Asia Pvt. Ltd, Pune, Maharashtra; Widia (India) Ltd, Bengaluru, Karnataka; Rapicut Carbides Ltd, Ankleshwar, Gujarat; Mishra Dhatu Nigam Ltd, Hyderabad, Andhra Pradesh; and Sunflag Iron & Steel Co. Ltd, Bhandara, Maharashtra were the important consumers of ferrotungsten for production of alloy steel. However, the current information regarding consumption of ferrotungsten by these companies are not available. Mining Machinery Industry is the main consumer of the imported ore/concentrates.

WORLD REVIEW

World tungsten resources are geographically widespread. China ranks first in the world in terms of tungsten resources and reserves and has some of the largest deposits. The world reserves of tungsten in terms of metal content are about 3.7 million tonnes, distributed broadly amongst China (51%), Russia (11%), Vietnam (3%) and Spain (1%) (Table-2).

The world mine production of tungsten in terms of metal content in 2020 increased marginally by 2% to 92,500 tonnes from 90,400 tonnes in 2019. China was the leading producer (82%) followed by

**Table - 2: World Reserves of Tungsten
(By Principal Countries)**

(In '000 tonnes of Tungsten content)	
Country	Reserves
World: Total (rounded)	3700
Austria	10
Bolivia	NA
China	1900
Korea, Rep.of	29
Portugal	5.1
Russia	400
Rwanda	NA
Spain	52
USA	NA
Vietnam	100
Other countries	1200

Source: USGS, Mineral Commodity Summaries, 2022

Vietnam (9%), Russia (3%) and Austria, Bolivia, Korea Rep. of & Rwanda (1% each) (Table-3).

**Table – 3 : World Mine Production of Tungsten
(By Principal Countries)**

(In tonnes of metal content)			
Country	2018	2019	2020
World:Total (rounded)	81200	90400	92500
Austria	936	892	896
Bolivia	1043	813	1030
China	64938	75452	76000
Congo, Dem. R.	230	700	128
Korea,Rep.of	1370 ^e	1130 ^e	1100 ^e
Russia	2661	2825	2692
Rwanda ^a	1039	1303	956
Spain	856	414	184
Vietnam	4350	4816	8066
Other countries	3764	2055	1463

Source: BGS, World Mineral Production, 2016-2020.

a:Includes exports and year ended 30 June of that stated

FOREIGN TRADE

Exports

Exports of tungsten and alloys including scrap decreased by 7% to 292 tonnes in 2020-21 from 313 tonnes in the previous year. Exports were mainly to Germany (51%), Finland (13%), Sweden (7%), Japan (6%), USA (5%), Thailand & Bangladesh (2% each). In the year 2020-21 and 2019-20, exports of tungsten ore & concentrates were reported as Nil (Tables-4 to 11).

Imports

Imports of tungsten and alloys including scrap decreased by 15% to 327 tonnes in 2020-21 from 386 tonnes in the previous year. Imports were mainly from China (43%), Austria (16%),Korea, Rep. of (14%), USA (13%), Germany & Singapore (3% each) . Imports of tungsten ores and concentrate also decreased by 73% to 121 tonnes in 2020-21 from 447 tonnes in the previous year. Imports were mainly from Netherlands (50%) followed by Japan (35%) and Belgium (15%) (Tables-12 to 21).

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**Table-4: Exports of Tungsten and Alloys Incl. Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	313499	870314	292331	835275
Germany	31494	116923	148034	227357
Japan	3935	65339	18744	108756
Finland	8737	27597	38225	59983
Singapore	10297	40174	4294	51744
Sweden	20914	54808	20575	48912
USA	29359	70194	15543	42911
Bangladesh	6055	40321	4904	40165
Poland	2626	45080	1852	33891
Mexico	35300	45582	3626	26612
Thailand	44616	29520	5459	25002
Other countries	120166	334776	31075	169942

Figures rounded off

**Table-5: Exports of Tungsten Wire
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	23701	348027	16999	296924
Japan	3822	64398	5338	93616
Germany	4337	84344	2445	55020
Poland	2591	44709	1852	33891
Italy	2748	40068	1858	22503
Korea, Rep. of	931	13384	919	14684
USA	573	11934	610	14110
France	703	11229	745	12023
China	651	6185	346	10127
Switzerland	430	7002	546	9611
Sweden	914	14406	564	8930
Other countries	6001	50368	1776	22409

Figures rounded off

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**Table-6: Exports of Tungsten Waste & Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	121385	138381	144607	174279
Germany	19947	24625	107200	124506
Finland	8000	8976	23900	34322
Japan	-	-	13406	15140
UAE	-	-	100	309
Nepal	-	-	1	2
Vietnam	37330	44150	-	-
USA	15500	20895	-	-
Korea,Rep. of	15000	15789	-	-
Netherlands	14931	10606	-	-
Singapore	7948	10080	-	-
Other countries	2729	3260	++	++

Figures rounded off

**Table-7: Exports of Tungsten Unwrought
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	1871	1645	48391	58097
Germany	-	-	32910	38030
Finland	-	-	14000	16905
Austria	-	-	186	1926
Nigeria	1580	612	997	711
Kenya	-	-	80	175
Cameroon	-	-	35	83
Israel	-	-	2	65
Singapore	-	-	3	35
Rwanda	-	-	14	29
Oman	-	-	10	27
Other countries	291	1033	154	111

Figures rounded off

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**Table-8: Exports of Tungsten Filament
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	7226	70313	5027	51388
Bangladesh	2308	39063	4341	39933
Iran	2023	22390	274	5724
Sri Lanka	184	3371	178	3338
China	73	1976	28	923
UAE	-	-	38	777
Indonesia	-	-	100	317
Nepal	30	367	47	186
Nigeria	-	-	10	108
Korea, Rep.of	-	-	3	41
Gambia	-	-	2	26
Other countries	2608	3146	6	15

Figures rounded off

**Table-9: Exports of Tungsten & Alloys Unwrought
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	159316	311948	77307	254587
Singapore	2349	30094	4291	51709
Sweden	20000	40402	20011	39982
USA	13286	37365	14933	28801
Mexico	35300	45582	3626	26612
Thailand	41878	26208	5459	25002
Taiwan	133	2932	1575	16413
China	2171	11962	2727	13344
Germany	7185	7547	5479	9801
France	4265	4497	770	8020
Turkey	557	6453	1220	6683
Other countries	32192	98906	17216	28220

Figures rounded off

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**Table-10: Exports of Tungsten Powder
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	16810	33469	8083	17188
USA	11650	26957	7663	15684
Malaysia	-	-	300	1033
Egypt	6	20	100	426
Sri Lanka	-	-	20	45
China	1760	3871	-	-
UK	2260	1205	-	-
Thailand	800	1092	-	-
Turkey	22	146	-	-
Puerto Rico	50	127	-	-
Kenya	30	32	-	-
Other countries	232	19	++	++

Figures rounded off

**Table-11: Exports of Tungsten & Alloys: Worked Nes
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	142506	278479	69224	237399
Singapore	2349	30094	4291	51709
Sweden	20000	40402	20011	39982
Mexico	35300	45582	3626	26612
Thailand	41078	25116	5459	25002
Taiwan	133	2932	1575	16413
China	411	8091	2727	13344
USA	1636	10408	7270	13117
Germany	7185	7547	5479	9801
France	4265	4497	770	8020
Turkey	535	6307	1220	6683
Other countries	29614	97503	16796	26716

Figures rounded off

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**Table –12: Imports of Tungsten & Alloys Incl. Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	385732	1467498	326673	1451447
China	181121	580762	141891	522068
Austria	40160	307042	51301	448758
Korea, Rep. of	61272	182133	44631	142538
USA	37805	81918	42767	100869
Singapore	11304	63899	9643	57729
Germany	11445	40112	8316	40968
Argentina	4000	17341	7000	30091
Israel	3300	7881	8062	20522
UK	9998	27928	4967	17922
Switzerland	3761	24015	1285	15366
Other countries	21566	134467	6810	54616

Figures rounded off

**Table - 13: Imports of Tungsten Ores & Conc.
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	447	69234	121	9104
Netherlands	380	51267	61	3542
Japan	35	13753	42	3334
Belgium	-	-	18	1789
Singapore	2	1741	++	439
Sweden	30	2473	-	-

Figures rounded off

**Table-14: Imports of Ferro-Tungsten
(By Countries)**

	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4	9250	13	23282
China	4	7519	9	15511
Belgium	-	-	4	7448
USA	++	292	++	171
Turkey	-	-	++	152
UK	++	1439	-	-

Figures rounded off

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**Table-15: Imports of Tungsten Wire
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	102192	513732	106049	565540
China	70491	311418	68502	296869
Austria	23065	170382	31614	253195
Singapore	6680	16202	5107	12106
Hungary	1180	2461	648	1419
Japan	202	4942	23	856
Belgium	25	135	45	388
Germany	254	3164	17	261
USA	34	482	71	182
UK	23	1257	14	127
Poland	107	2323	2	84
Other countries	131	966	6	53

Figures rounded off

**Table-16: Imports of Tungsten Waste & Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	19118	28993	-	-
UK	7536	12796	-	-
Belgium	6665	9856	-	-
Germany	4917	6341	-	-

Figures rounded off

**Table-17: Imports of Tungsten Unwrought
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	89051	206483	41373	141036
China	66309	124181	23787	62078
USA	14063	24591	10693	30037
Austria	5920	45676	3123	25184
UK	202	4168	208	7687
Germany	2215	5869	1611	6115
Hong Kong	-	-	1153	5740
Italy	316	1748	798	4195
Japan	26	250	-	-

Figures rounded off

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**Table-18: Imports of Tungsten Filament
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	2105	35720	1155	36975
Korea, Rep. of	344	16067	540	21610
Taiwan	154	6600	143	7057
China	1413	6752	192	2436
Germany	70	1448	79	1928
Thailand	65	3347	120	1430
Hong Kong	5	198	40	1371
USA	7	424	15	441
Japan	35	517	4	300
France	5	104	7	171
Singapore	2	172	1	100
Other countries	5	91	14	131

Figures rounded off

**Table-19: Imports of Tungsten Powder
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	109865	295158	99353	273186
Korea, Rep. of	60830	165429	43550	117607
USA	22737	39749	24431	48979
China	12270	33173	12411	33759
Argentina	4000	17341	7000	30091
Germany	3213	16037	3521	20327
Israel	3300	7881	8000	19977
France	320	1729	251	1796
Hong Kong	-	-	150	499
Singapore	11	144	10	67
Thailand	-	-	28	64
Other countries	3184	13675	1	20

Figures rounded off

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**Table-20: Imports of Tungsten & Alloys: Worked Nes
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	63401	387412	78743	434710
Austria	11175	90984	16555	170285
China	30638	105238	36999	126926
Singapore	4611	47381	4525	45456
USA	964	16672	7557	21230
Switzerland	3761	23997	1284	15339
Germany	776	7253	3088	12337
Japan	473	8707	579	12147
UK	962	4401	4745	10108
Italy	4	80	820	6942
Hong Kong	68	313	1102	5433
Other countries	9969	82386	1489	8507

Figures rounded off

**Table-21: Imports of Tungsten & Alloys Unwrought
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	173266	682570	178096	707896
Austria	11175	90984	16555	170285
China	42908	138411	49410	160685
Korea, Rep. of	60928	166066	44086	120899
USA	23701	56421	31988	70209
Singapore	4622	47525	4535	45523
Germany	3989	23290	6609	32664
Argentina	4000	17341	7000	30091
Israel	3300	7881	8058	20512
Switzerland	3761	23997	1284	15339
Japan	492	8795	579	12147
Other countries	14390	101859	7992	29542

Figures rounded off

FUTURE OUTLOOK

Strong growth in tungsten market is driven by the surging demand for downstream tungsten products in varied end-user sectors including automotive, industrial engineering, energy and aviation. Apart from that, the uncovering of a wide-range of applications in allied industries like medical, defense and electric & electronic, has had an impelling effect on growth of the tungsten market.

Based on application, global tungsten market has been segmented into tungsten carbide, metal alloys, mill products and other applications, such as, salts, tungstates, sulfides, oxides, etc. Carbide is the largest application segment and usage of these products as drilling, boring and cutting tools in various industries will drive its market. Mill products of tungsten and their applications are another important segment. Mill products are pure tungsten metal products, such as, electrodes, lighting filaments, electrical & electronic contacts, sheets, wires, rods, etc. Developments in the Electronics Industry will be the major factor driving the mill tungsten market growth.

In India, the entire demand of tungsten can only be met by imports and recycling, as there is no indigenous production of tungsten ore & concentrates. High content of WO_3 in the tailing dumps of Kolar can be worked on priority basis to meet the demand.

World tungsten supply was dominated by production in China and exports from China. China's Government regulated its Tungsten Industry by limiting the number of mining and export licences, imposing quotas on concentrate production, and placing constraints on mining and processing. Scrap continued to be an important source of raw material for the Tungsten Industry worldwide. China was the world's leading tungsten consumer.

As per Tungsten - Outlook to 2030, 15th Edition by Roskill, China has for several decades been the world's largest mine and refined producer of tungsten, accounting for just over 80% of mine output in 2020. It is similarly dominant in the production of the tungsten intermediates ammonium paratungstate and tungsten oxide, and of tungsten metal powder and tungsten carbide. A large proportion of this output feeds the country's substantial Cemented Carbide Tool Sector, but there is also sizeable export of tungsten refined and finished products to the rest of the world – making Chinese mine and refined production of tungsten integral to conditions in the global market. Looking ahead, the tungsten market still faces several headwinds. Global vehicle production remains below pre-pandemic levels and far below 2017's peak production levels. With the threat of greater uptake of electric vehicles over internal combustion engines, tungsten consumption in the automotive sector may never recover to 2017 levels. In addition, market sentiment remains subdued by the ongoing trade dispute between the USA and China. There remain bright spots for the industry, with long-term growth set for most first-use sectors. Strong growth in superalloys and other alloys is set to drive steel and alloys demand, whilst in the Chemicals Sector, the use of semiconductors and demand for consumer electronics is expected to enter another period of promising demand. In the Cemented Carbides Sector, strong growth in most demand segments will offset lacklustre performance in automotive tooling. In addition, there are opportunities further up the supply chain for new mine projects to come online. Several large mines in China and Russia are reaching their end of life and will need to be replaced for the market to remain adequately supplied.