

MAGNESITE

Introduction

Magnesite, a magnesium carbonate ($MgCO_3$), usually occurs as a secondary deposit as veins and in an alteration product of ultrabasic rocks, serpentinite and other magnesium rich rock types. In India, deposits of commercial significance are located in Uttarakhand, Tamil Nadu, Karnataka & Rajasthan. Other states where resource estimates have been made are Jammu & Kashmir and Himachal Pradesh, with meagre amount in Andhra Pradesh & Kerala.

Magnesite in Uttarakhand and Tamil Nadu occurs as an alteration product of ultra basic rocks. Tamil Nadu Magnesite is characterised by high silica content and Uttarakhand magnesite by calcium, which are deleterious constituents.

The primary use of raw magnesite is in the calcination industry in which about 98% of raw magnesite is consumed. The dead-burnt magnesite (DBM) and fused magnesite are used in refractory industry for manufacturing various refractory products. The low calcined magnesite (caustic magnesia) is used in non-refractory uses and in the manufacture of sord cement (magnesium oxychloride).

Basis of Grade Classification

The following end-use grade classification of magnesite has been adopted in the NMI as on 1.4.2015.

1. High Grade : Directly useable for making high grade DBM.

MgO	-	45.5% min
SiO ₂	-	2.5% max
CaO	-	1.5% max

2. Medium Grade : Directly useable for making ordinary DBM.

MgO	-	42.5% min
SiO ₂	-	2.5% to 4% max
CaO	-	1.5% max

3. Beneficiable/Low grade :

- a) MgO - 38 to below 42.5%
Magnesite amenable to reduce silica content by simple dressing and sorting.
- b) MgO-35%, CaO-3% (max), Fe₂O₃-3% (max)

This is beneficiated by flotation or other methods.

4. Others : Estimation of such grade through useable/marketable but cannot be classified into above grades.
5. Unclassified : Range of minimum and maximum values of the constituents are too wide to classify under above grades.

Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), resources are broadly classified into 'reserves' and 'remaining resources'.

According to the norms of this system, the reserves of magnesite have been placed under proved (111) and probable (121), (122) categories. The remaining resources have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332) inferred (333) and reconnaissance (334) categories.

Salient Features of the Inventory

The total resources of magnesite in the country as on 1.4.2015 are estimated at 394 million tonnes with 82 million tonnes (21%) under reserve category and the balance 312 million tonnes (79%) under remaining resources category. Out of the total resources, about 275 million tonnes (70%) are in freehold and 119 million tonnes (30%) in leasehold areas.

All India scenario of magnesite reserves, remaining resources and total resources as on 1.4.2015 vis-a-vis 1.4.2010 have been given in Tables-1 and 2. The Tables give an idea about changes in terms of increase or decrease of resources as per lease status, grade and state. In Table -3, district-wise reserves/resources have been given.

Of the total resources of magnesite, about 3.2 million tonnes (0.8%) constitutes high grade, 106.5 million tonnes (27%) medium grade, 154.8 million tonnes (39.3%) beneficiable/low grade, 118.2 million tonnes (30%) in mixed grade constituting high, medium & low grades. The balance 11.2 million tonnes (2.8%) are in others, unclassified and not known grades.

The major resources of magnesite have been estimated in Rajasthan, Tamil Nadu and Uttarakhand. Out of these, Uttarakhand is credited with 231 million tonnes (59%) resources, followed by Tamil Nadu 98

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**Table - 1 : Reserves/Resources of Magnesite as on 1.4.2015 (P) vis-à-vis 1.4.2010
(By Lease Status/Grade)**

Lease status/Grade	Reserves			Remaining resources			Total resources		
	1.4.2015	1.4.2010	Net change	1.4.2015	1.4.2010	Net change	1.4.2015	1.4.2010	Net change
All India : Total	82277	41950	(+) 40327	311711	293222	(+) 18489	393988	335172	(+) 58816
High	-	2618	(-) 2618	3249	631	(+) 2618	3249	3249	No Change
Medium	79174	30040	(+) 49134	27318	16508	(+) 10810	106492	46548	(+) 59944
Beneficial/Low	2949	3491	(-) 542	151850	149986	(+) 1864	154799	153477	(+) 1322
High & Medium mixed	-	-	No Change	2339	2580	(-) 241	2339	2580	(-) 241
Medium & Low mixed	-	1496	(-) 1496	115910	116117	(-) 207	115910	117613	(-) 1703
High, Medium & Low mixed	-	-	No Change	-	-	No Change	-	-	No Change
Others	146	4110	(-) 3964	7480	3885	(+) 3595	7626	7995	(-) 369
Unclassified	-	-	No Change	83	83	No Change	83	83	No Change
Not Known	8	194	(-) 186	3482	3433	(+) 49	3491	3627	(-) 137
Freehold	-	-	No Change	274646	274646	No Change	274646	274646	No Change
High	-	-	No Change	2	2	No Change	2	2	No Change
Medium	-	-	No Change	4362	4362	No Change	4362	4362	No Change
Beneficial/Low	-	-	No Change	148543	148543	No Change	148543	148543	No Change
High & Medium mixed	-	-	No Change	2313	2313	No Change	2313	2313	No Change
Medium & Low mixed	-	-	No Change	115910	115910	No Change	115910	115910	No Change
High, Medium & Low mixed	-	-	No Change	-	-	No Change	-	-	No Change
Others	-	-	No Change	-	-	No Change	-	-	No Change
Unclassified	-	-	No Change	83	83	No Change	83	83	No Change
Not Known	-	-	No Change	3433	3433	No Change	3433	3433	No Change
Leasehold (Private)	4975	16328	(-) 11353	23249	7291	(+) 15958	28224	23619	(+) 4605
High	-	8	(-) 8	36	28	(+) 8	36	36	No Change
Medium	2050	7436	(-) 5386	12965	1509	(+) 11456	15015	8945	(+) 6070
Beneficial/Low	2772	3088	(-) 316	2720	1443	(+) 1277	5492	4531	(+) 961
High & Medium mixed	-	-	No Change	26	267	(-) 241	25	267	(-) 242
Medium & Low mixed	-	1496	(-) 1496	-	207	(-) 207	25	1703	(-) 1703
High, Medium & Low mixed	-	-	No Change	-	-	No Change	-	-	No Change
Others	146	4106	(-) 3960	7452	3836	(+) 3616	7598	7942	(-) 344
Not Known	8	194	(-) 186	49	49	(+) 49	58	194	(-) 136
Leasehold (Public)	77301	25623	(+) 51678	13816	11284	(+) 2532	91118	36907	(+) 54211
High	-	2610	(-) 2610	3210	600	(+) 2610	3210	3210	No Change
Medium	77124	22605	(+) 54519	9991	10636	(-) 645	87116	33241	(+) 53875
Beneficial/Low	177	403	(-) 226	587	-	(+) 587	763	403	(+) 360
High & Medium mixed	-	-	No Change	-	-	No Change	-	-	No Change
Medium & Low mixed	-	-	No Change	-	-	No Change	-	-	No Change
High, Medium & Low Mixed	-	-	No Change	-	-	No Change	-	-	No Change
Others	-	4	(-) 4	28	48	(-) 20	28	52	(-) 24

figures rounded off.

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million tonnes (25%), Rajasthan 54 million tonnes(14 %) and rest (2 %) is accounted for by other states viz. Andhra Pradesh, Himachal Pradesh, Jammu & Kashmir, Karnataka and Kerala.

A net increase of about 59 million tonnes resources of magnesite have been recorded in the inventory as on 1.4.2015 in comparison to 1.4.2010. This has resulted due to increase of 59 million tonnes resources in leasehold areas. Further, 5 new leasehold deposits with 1.6 million tonnes resources were also included as on 1.4.2015.

In Tamil Nadu, a sharp increase of 57.7 million tonnes of resources have been recorded. This was mainly due to the re-assessment of resources of 'Red Hill' mine in Salem District, after take-over of this leasehold mine by M/s.SAIL Refractory Co.Ltd. from M/s.Burn Standard Co. Ltd. Further, 4 new deposits (with 1.2 million tonnes resources) in Karur, Salem &

Tiruppur districts also contributed in increase of resources. In Karnataka, there is an increase of 1.9 million tonnes of resources due to re-assessment resources in 4 leasehold deposits in Mysore district. In Uttarakhand, inclusion of 1 new leasehold private deposit in Pithoragarh district was recorded. Depletion of about 0.8 million tonnes resources in Jammu & Kashmir and Uttarakhand was reported.

About 33% (132 million tonnes) of the total resources of magnesite estimated in the country are under inferred (333) and reconnaissance (334) categories. These estimates are based on a very limited preliminary exploration. If these areas are examined for further detailed exploration, the confidence level of the magnesite resources may improve.

A total 132 deposits of magnesite have been covered in the NMI as on 1.4.2015; out of which 89 deposits are in freehold and 43 deposits in leasehold areas (leasehold public-12 and leasehold private-31) including 5 new deposits.

Table – 2 : Total Resources of Magnesite as on 1.4.2015 (P) vis-à-vis 1.4.2010 (By States)

State	Total Resources		Net Change
	(In '000 tonnes)		
	As on 1.4.2015	As on 1.4.2010	
All India : Total	393988	335172	(+) 58816
Andhra Pradesh	80	80	No Change
Himachal Pradesh	298	298	No Change
Jammu & Kashmir	4145	4245	(-) 100
Karnataka	5981	4046	(+) 1935
Kerala	40	40	No Change
Rajasthan	53804	53804	No Change
Tamil Nadu	98226	40511	(+) 57715
Uttarakhand	231413	232148	(-) 735

Figures rounded off

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Table - 3 : District wise Reserves/Resources of Magnesite as on 1.4.2015 (P)

(In '000 tonnes)

State/District	Reserves	Remaining Resources	Total Resources
All India : Total	82276	311711	393988
Andhra Pradesh	-	80	80
Cuddapah	-	80	80
Himachal Pradesh	-	298	298
Chamba	-	298	298
Jammu & Kashmir	-	4145	4145
Leh	-	45	45
Reasi	-	3950	3950
Udhampur	-	149	149
Karnataka	1389	4592	5981
Coorg	-	75	75
Mandya	-	820	820
Mysore	1389	3697	5086
Kerala	-	40	40
Pallakad	-	40	40
Rajasthan	-	53804	53804
Ajmer	-	6372	6372
Dungarpur	-	45000	45000
Pali	-	2427	2427
Udaipur	-	5	5
Tamil Nadu	73577	24649	98226
Coimbatore	-	387	387
Dharmapuri	-	8	8
Karur	27	12	40
Namakkal	-	368	368
Nilgiris	-	161	161
Salem	73005	22893	95897
Tiruchirapalli	-	27	27
Tirunelveli	-	7	7
Tiruppur	545	356	901
Vellore	-	430	430
Uttarakhand	7310	224103	231413
Almora	-	2500	2500
Bageshwar	5999	71156	77155
Chamoli	132	8120	8253
Pithoragarh	1179	142327	143506

figures rounded off.