

OCHRE



# Indian Minerals Yearbook 2016

(Part- III : Mineral Reviews)



**55<sup>th</sup> Edition**

**OCHRE**

**(FINAL RELEASE)**

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

Indira Bhavan, Civil Lines,  
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471  
PBX : (0712) 2562649, 2560544, 2560648  
E-MAIL : [cme@ibm.gov.in](mailto:cme@ibm.gov.in)  
Website: [www.ibm.gov.in](http://www.ibm.gov.in)

**February, 2018**

## 37 Ochre

---

Ochre is a natural mineral pigment known to man from his historical past. In ancient times it had been used in colouring earthen-ware, household utensils and for decorative purposes. Though its use dates back to prehistoric times, ochre's use only became widespread in the late 19<sup>th</sup> century, when Jean-Etienne Astier of Roussillon introduced the industrial process for making ochre pigment.

It occurs in various shades and colours generally ranging from yellow to deep orange or brown. The pigmentary strength of ochre is mainly due to the presence of oxides of iron. The presence of hydrated iron oxide imparts yellow colour and anhydrous iron oxide red. A mixture of ferrous and ferric oxide imparts mainly brown besides other shades.

Depending upon the colour, the ochres are called red ochre, yellow ochre, green earth, sienna, umber and various other names. In addition to red ochre, the red oxide of iron, commonly called 'red oxide' is an important natural pigment which results from alteration of haematite & ferruginous laterite.

Red ochre is mostly used in cement industry. The cement grade mix raw material requires a minimum quantum of iron and alumina. The red ochre mixed with limestone makes a perfect mix of constituents in the raw material fed to the cement manufacturing units.

Ochres are non-toxic and are used in manufacturing of paints that not only dries quickly but also covers surfaces thoroughly. Occurrences of ochre have been reported from several states in the country.

### RESERVES/RESOURCES

Deposits of red ochre are found chiefly in Bharatpur, Bhilwara, Bikaner, Chittorgarh & Udaipur districts in Rajasthan; Gwalior, Katni and Rewa districts in Madhya Pradesh;

Anantapur, Kadapa, Visakhapatnam districts in Andhra Pradesh; Bhavnagar, Kachchh & Patan districts in Gujarat; Ballari & Bidar districts in Karnataka and Chandrapur district in Maharashtra.

Deposits of yellow ochre are found in Guntur and Kurnool districts in Andhra Pradesh, Jabalpur, Mandla, Satna & Shahdol districts in Madhya Pradesh and Nagpur district in Maharashtra.

The total reserves/resources of ochre as on 1.4.2015 as per the NMI data, based on UNFC system, have been estimated at 167.79 million tonnes. Out of these resources, about 36.93 million tonnes are under 'Reserves' category and 130.86 million tonnes are under 'Remaining Resources' category. Of the total, about 87% resources are of red ochre, 11% are of yellow ochre and the remaining 2% are of grades "Not-known". About 78% resources are concentrated in Rajasthan, followed by Madhya Pradesh 11%, Andhra Pradesh 7% and Gujarat about 2%. The remaining 2% resources are located in Karnataka, Maharashtra, Jharkhand and Uttar Pradesh (Table-1).

### PRODUCTION & STOCKS

As per GOI Notification S.O.423(E) dated 10<sup>th</sup> February 2015, 'Ochre' has been declared as 'Minor Mineral' hence the production beyond January 2015 is not available with IBM. The list of producers of ochre is given in Table-2.

### EXPLORATION & DEVELOPMENT

During the year 2015-16, DGM, Rajasthan carried out exploration for red ochre near villages Ojhara, Hamirgarh, Renwas, Barliyas in Kotri tehsil, Rajasthan. The exploration work included regional mineral survey, regional geological mapping and detailed geological mapping over an area of 250 sq.km, 20 sq. km and 2.5 sq. km, respectively. Twenty four samples have also been collected.

**Table – 1 : Reserves/Resources of Ochre as on 1.4.2015**  
(By Grades/States)

Grade/State	Reserves				Remaining Resources				Total Resources (A+B)				
	Proved	Probable	Total	Feasibility	Pre-feasibility	Measured	Indicated	Inferred		Reconnaissance			
	STD111	STD121	STD122	STD211	STD221	STD331	STD332	STD333		STD334			
<b>All India : Total</b>	<b>21959552</b>	<b>4448341</b>	<b>10525912</b>	<b>36933805</b>	<b>44924890</b>	<b>13936202</b>	<b>31896176</b>	<b>2559245</b>	<b>3560819</b>	<b>32369262</b>	<b>1612607</b>	<b>130859201</b>	<b>167793006</b>
<b>By Grades</b>													
Red Ochre	16332257	4448341	9775941	30556539	43386327	12810591	28564110	1922633	1316886	25711807	1610486	115322840	145879380
Yellow Ochre	5626356	-	75802	5702158	1404292	912286	1796007	596612	2071612	5528926	2121	12311856	18014014
Not-known	939	-	674169	675108	134271	213324	1536059	40000	172321	1128529	-	3224505	3899613
<b>By States</b>													
Andhra Pradesh	5284990	-	64602	5349592	1404230	430231	1087353	347681	-	3596595	2121	6868210	12217802
Chhattisgarh	-	-	-	-	-	142	-	-	-	-	-	142	142
Gujarat	37862	-	75703	113565	-	32699	4303	-	-	3016066	-	3053068	3166633
Jharkhand	0	-	-	-	62	-	4	-	147	-	-	214	214
Karnataka	0	-	-	-	-	-	1766367	-	-	-	20000	1786367	1786367
Madhya Pradesh	1605342	194757	1895247	3695346	681904	1653225	5402710	356344	2577575	3732142	749250	15153150	18848495
Maharashtra	22260	-	16000	38260	-	-	156740	6010	6010	286000	-	454760	493020
Rajasthan	15009099	4253584	8474360	27737043	42838694	11819905	23478699	1824210	942087	21728459	841236	103473290	131210333
Uttar Pradesh	-	-	-	-	-	-	-	25000	35000	10000	-	70000	70000

Figures rounded off.

## MINING & PROCESSING

Ochre is worked by shallow open-pit mining. Red and yellow ochres occur separately in different bands, depending upon the hydration either in the same mine or in different mines. The run-of-mine contains gritty matter which is removed by levigation & also by hand sorting wherever possible.

Preparation of pigments from ochre requires an elaborate process. Since it is hard, it has to undergo milling and finally separation of the coarse particles by elutriation. Ochre being friable is crushed and lixiviated just like china clay to obtain extremely fine -textured material of uniform colour.

**Table – 2 : Producers of Ochre**

Name & address of producer	Location of mine	
	State	District
Mohd. Sher Khan, S/o Gulbaz Khan, Khwaja Bagh, Post Sawa- 312 613, Distt: Chittorgarh, Rajasthan.	Rajasthan	Chittorgarh
*Smt. Parvati Inani, 32-A, Kumbha Nagar, Chittorgarh - 312 001 Rajasthan.	Rajasthan	Chittorgarh
Anil Kumar Sukhwal 733, Near Bus Stand, Sawa - 312 001, Distt. Chittorgarh, Rajasthan.	Rajasthan	Chittorgarh
*Mohd. Saeed Khan, S/o Md. Sher Khan , At & Post Sawa - 312 613, Distt. Chittorgarh, Rajasthan.	Rajasthan	Chittorgarh
*Sajid Ali Nai Abadi, Kanoj Road, Post: Sawa - 312 613, Distt. Chittorgarh, Rajasthan.	Rajasthan	Chittorgarh
Mohammad Rashid Shekh, Nai Abadi, Kajorpura, Post Sawa, Distt. Chittorgarh - 312 613, Rajasthan.	Rajasthan	Pratapgarh
Indermal Darji, Near Jain Temple, At & Post Sawa - 312 613, Distt. Chittorgarh, Rajasthan.	Rajasthan	Chittorgarh

\* Producing ochre as an associated mineral.

## CONSUMPTION

Consumption of ochre in 2015-16 in the organised sector was at 2,191 thousand tonnes of which Cement Industry alone consumed the maximum production (99%). The Ceramic and Paint Industries accounted for the remaining consumption. A sizeable quantity is believed to have been consumed by small-scale units as well as cottage industries. However, consumption data for these sectors are not available (Table-3).

Ochre is used in colourwashes, distempers, oil paints, lacquers, primers tiles & ceramic, fertilizer, ferro-alloys, welding flux manufacturing, brake lining, oil well drilling and also for imparting colour to paper and cement. It dominates the market because it is cheaper, available in abundance and has good pigmentary quality.

At present, synthetic ferric oxide and other pigments are manufactured extensively and these possess better pigmentary properties than natural ochre. Synthetic products are fast replacing the natural ones, particularly because of quality.

OCHRE

**Table – 3 : Consumption\* of Ochre, 2013-14 to 2015-16  
(By Industries)**

(In tonnes)

Industry	2013-14	2014-15 (R)	2015-16 (P)
<b>All Industries</b>	<b>2294000</b>	<b>2219200</b>	<b>2190900</b>
Cement	2283900	2209200	2170100
Ceramic	8900	8900	19400
Paint	1200	1100	1400

Figures rounded off.

\* Includes actual reported consumption and/or estimates made wherever required and due to paucity of data, consumption may not be complete.

*Note:* The consumption data do not include consumption in small-scale units, cottage industries, colour washing, construction industry, etc.

## FOREIGN TRADE

### Exports

Exports of ochre decreased substantially to 3,633 tonnes in 2015-16 from 4,034 tonnes in the previous year. Out of total exports in 2015-16, exports of earth colours were 1,760 tonnes, red oxide 1,385 tonnes and yellow ochre 488 tonnes. Exports of ochre (total) were mainly to Philippines (39%), Saudi Arabia (17%), Tanzania (8%) and Thailand (5%). Exports of earth colours were mainly to Philippines (78%) and Saudi Arabia (11%). Exports of yellow ochre were to Saudi Arabia (48%), USA and Tanzania (14% each). Exports of red oxide were to Saudi Arabia and Tanzania (15% each) and Thailand (12%). Exports of earth clay in 2015-16 were 9,000 tonnes compared to 8,915 tonnes in the previous year. Exports were mainly to Saudi Arabia (47%), Korea Rep.of (22%), Malaysia (10%) & Bangladesh (5%) (Tables- 4 to 9).

### Imports

Imports of ochre decreased to 135 tonnes in 2015-16 from 176 tonnes in the previous year. Out of total imports in 2015-16, imports of earth colours were 48 tonnes, red oxide 78 tonnes and yellow ochre 7 tonnes only. Imports of ochre (total) were mainly from China (41%), Germany (37%) & USA (16%). Imports of earth colours and

persian red were entirely from Germany and USA respectively. Imports of yellow ochre were from China (43%), Germany and Italy (29% each). Imports of red oxide were from China (68%) and USA(26%). Imports of earth clay were,12 tonnes in 2015-16 as against 4,617 tonnes in the previous year.The imports were entirely from Japan (Tables- 10 to 15).

**Table – 4 : Exports of Ochre : Total  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>4034</b>	<b>92570</b>	<b>3633</b>	<b>75048</b>
Philippines	1138	19352	1433	14927
Saudi Arabia	789	21203	626	13458
USA	48	1971	83	10783
Nepal	233	2602	80	5051
Ethiopia	217	4564	80	4145
Thailand	212	5479	168	3408
Tanzania	241	3760	274	3401
South Africa	51	1097	94	2943
Iraq	-	-	108	2710
Guinea	107	2662	125	2052
Other countries	998	29880	562	12170

**Table – 5 : Exports of Ochre: Earth Colours  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>1761</b>	<b>24363</b>	<b>1760</b>	<b>23550</b>
Philippines	1103	14562	1379	14506
Saudi Arabia	100	1349	185	3780
South Africa	20	613	75	2632
Kenya	9	370	37	1225
Spain	-	-	20	479
UAE	9	878	5	442
Italy	-	-	4	149
Fiji	2	182	5	105
Sri Lanka	-	-	2	75
Nepal	154	146	46	62
Other countries	364	6263	2	95

**Table – 6 : Exports of Ochre: Yellow Ochre  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>372</b>	<b>11415</b>	<b>488</b>	<b>14046</b>
Saudi Arabia	154	3659	232	4872
Nepal	++	122	8	4280
USA	32	915	70	1416
Spain	38	772	35	853
Tanzania	16	266	68	841
Greece	-	-	15	452
Bangladesh	14	1682	1	339
Ethiopia	26	464	15	238
South Africa	22	271	18	235
UK	-	-	11	228
Other countries	70	3264	15	292

**Table – 7 : Exports of Persian Red  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>++</b>	<b>62</b>	<b>-</b>	<b>-</b>
Nepal	++	62	-	-

**Table – 8 : Exports of Ochre: Red Oxide  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>1901</b>	<b>56730</b>	<b>1385</b>	<b>37452</b>
USA	16	1056	13	9367
Saudi Arabia	535	16195	209	4806
Ethiopia	22	1416	65	3907
Thailand	212	5479	168	3408
Iraq	-	-	108	2710
Tanzania	199	3090	206	2560
Guinea	107	2662	125	2052
Indonesia	97	1644	129	1718
Bangladesh	20	1686	3	1512
Mozambique	40	437	120	1064
Other countries	653	23065	239	4348

**Table – 9 : Exports of Earth Clay  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>8915</b>	<b>60566</b>	<b>9000</b>	<b>87141</b>
Saudi Arabia	5578	30221	4217	43424
Korea, Rep. of	775	4870	1943	12058
Malaysia	-	-	936	7347
Bangladesh	1015	14425	482	4992
Mozambique	40	492	313	3624
Kenya	20	162	216	3612
Sri Lanka	1	20	162	2876
Nigeria	76	687	152	1714
Nepal	195	1249	249	1338
USA	90	501	25	1052
Other countries	1125	7939	305	5104

**Table – 10 : Imports of Ochre: Total  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>176</b>	<b>25953</b>	<b>135</b>	<b>33920</b>
China	96	15440	56	16725
Germany	40	3259	50	7652
USA	25	2378	22	6322
Japan	++	79	++	1291
Italy	2	357	2	727
Brazil	1	441	1	467
Switzerland	-	-	++	407
UK	-	-	4	152
Hong Kong	-	-	++	73
Spain	++	23	++	60
Other countries	12	3976	++	44

**Table – 11 : Imports of Ochre: Earth Colours  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>37</b>	<b>1823</b>	<b>48</b>	<b>3860</b>
Germany	37	1739	48	3661
Italy	++	11	++	126
Belgium	-	-	++	43
UK	-	-	++	22
USA	++	44	++	8
China	++	29	-	-

**Table – 12 : Imports of Ochre: Yellow Ochre  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>18</b>	<b>5211</b>	<b>7</b>	<b>4877</b>
Germany	++	761	2	3825
Italy	1	190	2	601
China	7	464	3	213
Japan	-	-	++	166
USA	-	-	++	72
Thailand	9	1881	-	-
France	1	1063	-	-
Belgium	++	818	-	-
Finland	++	34	-	-

**Table – 13 : Imports of Persian Red  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>++</b>	<b>96</b>	<b>2</b>	<b>1840</b>
USA	++	96	2	1767
Hong Kong	-	-	++	73

**Table – 14 : Imports of Red Oxide  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>121</b>	<b>18823</b>	<b>78</b>	<b>23343</b>
China	89	14947	53	16513
USA	25	2238	20	4475
Japan	++	79	++	1125
Brazil	1	441	1	467
Switzerland	-	-	++	407
Germany	3	759	++	166
UK	-	-	4	130
Spain	++	23	++	60
Singapore	2	175	-	-
Italy	1	156	-	-
Other countries	++	5	-	-

**Table – 15 : Imports of Earth Clay  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>4617</b>	<b>2979</b>	<b>12</b>	<b>850</b>
Japan	700	728	12	629
Bangladesh	3917	2251	++	197
USA	-	-	++	13
Germany	-	-	++	11