



**RAMANI RANJAN CHOWDHURY**  
*(Mica Specialist)*

# HANDBOOK OF MICA

*Being a comprehensive treatise in six parts, dealing with Natural and Built-up Mica and Mica Products in all aspects, including Geology, Prospecting, Mining, Production, Manufacture, Utilisation and Marketing of Mica.*

By

RAMANI RANJAN CHOWDHURY

*(Mica Specialist)*

*Author of "India Mica", etc., etc.*

" \* \* \* In a very real sense, our vast electrical development is a monument to mica,—the one indispensable di-electric. The history of the intensive electrification that has been in progress during the last three decades, is the history of the modern mica industry \* \* \*".—

J. V. LEWIS.

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OTHER BOOKS BY THE SAME  
AUTHOR

1. India Mica, Vol. I. Price Rs. 5 inland; 7s. 6d. or \$2.00 foreign, exclusive of postage. To be had of the Economic Supply Agency, Post Box 11437, Calcutta, and other important booksellers in Calcutta.
2. Prospects of the Cane Sugar Industry in Bengal with a Foreword by John D. Nikas, General Manager, Messrs. Carew & Company, Darsana, Bengal. Price Rs. 2 net. To be had of the Economic Supply Agency, Post Box 11437, Calcutta, and other important booksellers.
3. Mica Directory and Who's Who in Mica (under preparation).

*For opinions see at the end of this book.*

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## PREFACE

Since the publication of "India Mica", Vol. I, in February 1932, friends from different parts of the globe urged me to expedite publication of Vol. II, in which I proposed to deal with the international aspects of mica. In view of the great slump in world trade, I decided to wait till a more opportune time. Since 1934, when business once more took a hopeful turn, the trade in mica improved and reached an unprecedented level in 1937, and in these favourable circumstances I have revised my plans and decided to write a comprehensive and up-to-date "Handbook of Mica".

Those who are interested in mica, particularly the mica vendors in India, are, in many cases, not in touch with the world's markets for the demand and supply of mica. The Indian dealers are also often not acquainted with the technique and other essentials of the industry. This is particularly true in regard to their study of the consumer's point of view. These factors are believed to be responsible for much of the abuses that have appeared in the mica trade during the last decade, resulting in a loss of confidence amongst important buyers. India now stands to lose in her international trading if she does not re-organise her mica industry on a more satisfactory basis. Previously India had no rivals in the supply of ruby muscovite mica, which had been her monopoly since about 1884. Now, however, she has seriously to reckon with competition from several muscovite-producing countries, such as South and East Africa and South America. Russia, the earliest and once the only supplier of muscovite mica to Western Europe and North America, has been re-organising her extinct mica industry and her output is already sufficient for her greatly enlarged domestic requirements. The time must shortly come when the proportion of Russian sheet mica production will increase and leave an exportable surplus. India has very little time to lose for re-organising her industry, but if this is carried out on an economic basis, she may still retain the advantages in regard to the preparation, classification and processes

of her mica products. In order to hold the premier position as the largest world supplier of sheet mica, it is necessary for the Indian mica industry to increase its efficiency by cutting down productive costs in all branches of the business, such as mining, manufacture and marketing, without impairing the technical side of the management.

The successful exploitation and development of the national resources of a country largely depend upon the availability of the requisite information regarding the extent, economic character and working facilities for the interested public, but India is very poorly equipped in this respect. The United States of America, Canada, etc., have moved far ahead in this direction and the Bureaux of Mines and Commerce of these countries regularly collect useful information and publish the same in cheap official information circulars, memoirs, bulletins, etc. Mica is a subject very seldom treated by general writers, or by scholars or technicians and the literature on it is very fragmentary and scattered. In India, the only sources of information are the Records and Memoirs of the Geological Survey of India. A few officers of this Department, including the distinguished geologist Sir Thomas Holland, have earnestly interested themselves in this mineral and as a result of the experiences of the Great War (1914-18), attention has been more widely directed to the survey and potentiality of this mineral reserve. A detailed official survey of the reserves of mica in Bihar is already in progress, which is expected to be completed in about a year or two. The Indian public, and mica men in particular, have so far cared very little to derive benefit from these publications; the methods followed in the mining of mica and mica manufacture are greatly wasteful and unscientific. Attempt has been made in the present monograph to treat the subject in a systematic manner and bring together, in one comprehensive volume, all that a mica man needs to know from the practical point of view.

In the preparation of this handbook, and in the study of the subject, I have received valuable guidance and assistance from numerous friends, publishers, authors and contributors of periodicals, journals and papers as also from the various publications of the Geological Survey and Mines Departments of the Governments of India, United States, Canada, Union of South Africa,

*Preface*

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etc., to all of whom I acknowledge my indebtedness. I am particularly grateful to the officers of the Geological Survey of India, specially Dr. A. M. Heron (Director), Dr. Cyril S. Fox, Dr. M. S. Krishnan and Dr. J. A. Dunn. I am also grateful for valuable help to Prof. P. N. Ghosh, Head of the Department of Applied Physics, University College of Science, Calcutta. Without this valuable guidance and assistance offered to me, I could not have accomplished my task. Special mention is also to be made of Messrs. Jaroslaw's Erste Glimmerwaren Fabrik in Berlin, Mr. William Brand, Jr., New York, Major W. I. Anderson of the Associated Insulation Products Ltd., London, Mr. F. C. Chrestien and Mr. W. G. G. Richards of Messrs. F. F. Chrestien & Co., Ltd.

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*Calcutta*, 1939.

RAMANI RANJAN CHOWDHURY.  
POST BOX 11437.

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\* Contributed by Dr. P. N. Ghosh, Sir Rash Bihari Ghosh Professor of Applied Physics, University College of Science, Calcutta.

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\*"NEMA"=The National Electrical Manufacturers Association of America.

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## APPENDIX I

### CODE FOR MICA INDUSTRY IN THE UNITED STATES\*.

A Code of Fair Competition for the mica industry was submitted and approved by the Administrator for the Industrial Recovery on 24th February, 1934. The Code consists of 10 articles, which are summarised as follows :—

*Article I*—states the purposes of the Act.

*Article II*—gives definitions and sets forth the following five divisions of the mica industry :—

- (a) The mining division.
- (b) The importing division.
- (c) The sheet-mica division.
- (d) The wet-ground mica division,
- (e) The dry-ground mica division, including grinders of shop or scrap mica, grinders of mica schist and those recovering mica from clay washing.

The manufacture of plate and other built-up mica is operating under the Code of Fair Competition for the electrical manufacturing industry.

*Article III*—deals with the working hours and comprises of six sections, summarised as follows :—

- (i) No employee shall work more than 40 hours a week nor more than 8 hours a day, provided however that for six weeks in any six-month period, an employee may work 48 hours a week.
- (ii) Outside salesman, executive or manager earning not less than \$35.00 a week is not restricted as to working hours. Emergency maintenance or repair works are limited to 48 hours per week.
- (iii) Engineers, firemen and cleaners may work 48 hours a week and not over 56 hours during any six weeks of any 6-month period.
- (iv) Watchmen may work 54 hours a week.
- (v) No employer shall permit any employee to work for a time which if totalled with working time expended with another employer in the industry would exceed the maximum allowed by the Code.
- (vi) No employee shall work more than 6 days in any seven-day period.

*Article IV*—this article specifies the minimum wages shown in the following table in the different divisions of the industry in two geographical sections, which embraces Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Virginia, and the

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\* Mica in 1934, U. S. Bureau of Mines Year Book.



Northern Section which includes all other states and territories of the United States :—

		Minimum hourly wages in the mica industry.	
		Southern section.	Northern section.
		\$	\$
1. Mining division	..	0·25	0·30
2. Importing division	..	0·30	0·35
3. Sheet-mica division	..	0·25	0·30
4. Wet-ground mica division—			
in grinding operations	..	0·30	0·35
in other operations	..	0·25	0·30
5. Dry-ground division—			
in grinding operations	..	0·275	0·325
in other operations	..	0·25	0·30

*Article V*—states that no person under 16 years of age shall be employed in the industry nor any person under 18 years of age in work which may be hazardous or dangerous to health.

*Article VI*—establishes a national code authority, consisting of the chairman of the division code authorities and not more than three other members appointed by the Administrator but without vote. It also defines the duties and powers of the code authority.

*Article VII*—establishes a divisional code authority of five members in each division of the industry and specifies how the members shall be elected and their duties and powers under the general supervision of the national code authority.

*Article VIII*—outlines a code of definite competitive practices and provides for the drafting of rules and regulations by the divisional code authority to make the code effective.

*Article IX*—provides for enforcement of the provisions of the code with the arbitration of the disputes within the industry.

*Article X*—guarantees that the employees have the right to organise and to bargain collectively through their representatives and that they shall not be required to join any company union. It also provides for cancellation or modification of the code by the president and allots one vote in the affairs of the mica industry to each corporation, partnership or individual who is a member of the code and provides that it becomes effective the second Monday after its approval by the president.

The writers of the chapters on mica in the *Minerals Year Book* observed on the effects of the code over the mica industry as follows :—

“It is difficult to predict the total economic effects of the code, but the short-time results will doubtless be increased wages, shorter hours and a probable increase in employment. Hearings on the code brought out that mica miners received 10 cents an hour and worked 50 to 60 hours a week, compared with the established 25 cents hourly wages and 40-hour week under the code.”

## APPENDIX II.

APPROXIMATE CHARGES OF WAREHOUSING AND CLEARANCES IN  
IMPORTANT FOREIGN CENTRES.\*

## (a) WAREHOUSE CHARGES ON MICA IN LONDON.

	1†	2†	3†
1. Landing (receiving ex steamer, London; landing and housing) ..	16s. per ton, min.; 5 tons per shipment.	1s. 1½d. per cwt.	15s. per ton.
2. Customs clearance ..	1s. 9d. per package.		
3. Weighing at landing or delivery.	2s. 6d. per ton.		
4. Port dues ..	1s. per ton.	1s. per ton.	1s. per ton.
5. Rent per week ..	9d. per ton.	11d. per ton.	9d. per ton.
6. Sampling (opening, nailing and closing).	1s. 6d.	1s. 10d. per case.	1s. 6d. per case.
Sampling while open ..	9d. per case	8d. per case.	
Sampling opening and delivery within city limits.	2s. 6d. per sample.		
7. Inspection ..		1s. 10d. to 2s. 6d.	1s.
Where contents removed from case and re-placed.			2s. 6d.
8. Port marking, etc., minimum 6d.	6d.	6d. per score of letters.	3d. per score of 20 letters less 10d.
9. Delivery to van ..		7d.	..
10. Warrant stamps, if warrants are issued.		3d. per warrant.	6d. per warrant.
11. Dock dues ..		none.	none.
12. Customs entry ..	5s.	"	5s. per consignment.
13. Cartage ..			none.
14. Fire ..		6" per cent.	5 per cent.

## (b) STORING OF MICA IN NEW YORK.

Merchandise can be stored under bond, without the payment of duty, for three years, and then duty paid only on that part which is withdrawn and put into consumption.

The storage should be made in warehouses adjacent to the piers, to keep down delivery expenses and cheap rates of insurance should be tried for. The important storage companies are:—

- The New York Dock Co., Brooklyn, N. Y.
- The Bush Terminal Warehouse, Brooklyn, N. Y.
- The Ponch Terminal, Staten Island.

\* Some of the rates shown are not current as they are subject to variation from time to time, but they would give an average idea of the nature of charges incurred.

† 1, 2 and 3 represent the rates of three different wharfingers.

This is where most of the ships from India dock to unload freight at New York. The rate for transferring from dock to warehouse is  $3\frac{1}{2}$  cents per case. The storage rate as charged by the three firms is:—

Labour, 1st month	..	..	7 cents per case
Storage	..	..	5 " " "

and until full delivery is taken, there will be only storage rates and the first month is the only month that the labour rate is charged for. The merchandise is, of course, covered by fire and sprinkler insurance. This ranges from about \$2.78 per \$1,000 to \$3.15 per \$1,000 depending on the particular warehouse the mica will be stored.

The original charge for entire handling is generally in the neighbourhood of \$8.00 which, of course, depends on the value or size of the shipments and quotations may be asked for at a set price of \$8.00 per shipment for the original entry.

As the draws are made, duties may be paid either by the customer or by the exporter's agent and the wharfingers may attend to the shipments depending on their size for \$2.00 to \$3.00 per shipment. This includes all incidentals.

*Warehouse Keepers in New York.*

TOWER'S WAREHOUSE, INC., N. Y.  
PENSON AND COMPANY, NEW YORK

**(c) MICA SHIPMENTS; EXPENSES AT HAMBURG.**

1. Landing charges by Hansa Line—Rm. 0.45 per 100 kg.
2. Rent for storage on wharf (by Hansa Line)—  
Rent 2 days free.  
" 6 " additional Rm. 0.02 per 100 kg. per day.  
" 24 " " " 0.03 " " "  
After 32 " " " 0.01 " " "
3. Delivery from wharf—Rm. 0.3 to Rm. 0.05 per 100 kg.
4. Transportation from wharf to warehouse—  

	Rm.	Rm.
Up to 3,000 kg.	.. 0.50 per 100 kg. not less than	10.00
3,000/5,000 "	.. 0.40 " " "	15.00
5,000/7,500 "	.. 0.35 " " "	20.00
7,500/10,000 "	.. 0.30 " " "	26.25
10,000/15,000 "	.. 0.25 " " "	30.00
15,000/20,000 "	.. 0.22 " " "	37.50
5. Receipt or delivery of warehouse—Rm. 0.22 per 100 kg. up to 50 tons. 0.16 per 100 if more than 50 tons.
6. Weighing—Rm. 0.10 per 100 kg.
7. Warehouse rent—Rm. 0.10 per 100 kg. per month.
8. Clearance charges—1 per cent. of the goods value.
9. Insurance premium (for storage) { against fire only—0.2 per thousand.  
  { against usual risks— $\frac{1}{2}$  per thousand.
10. Commission, postages, telephone and cable charges, etc., not included.  $\frac{1}{2}$  per thousand of the goods value for endeavours regarding receipt, warehousing, storage, insurance, delivery, collection and remittance.

**(d) MICA SHIPMENT LOCAL CHARGES AT ANTWERP.**

1. Reception from steamer on quay—Fcs. 11 plus 2½ per 1,000 kilos.
2. Cartage from steamer to railway station or to warehouse—Fcs. 42.50 plus 2½ per cent. per 1,000 kilos.  
Cartage from warehouse to railway station—Fcs. 42.50 plus 2½ per cent. per 100 kilos.
3. Warehouse rent—Fcs. 5 per 1,000 kilos and per month or part of month.
4. Customs clearance—These expenses depend upon the importance of the consignment with a minimum of fcs. 10.0 per sending.
5. Postage and petties—Fcs. 5, fcs. 7.50 or fcs. 10.0 per sending.
6. Watching expenses eventually payable to the import steamer.

## APPENDIX III.

## CURRENCIES, WEIGHTS AND MEASURES IN DIFFERENT COUNTRIES.

*English and Metric equivalents.*

1 pound (avoirdupois)*	= 16 oz. or 453.6 grammes.	1 inch = 25.40 mm.	1 foot = 30.48 cm.
100 lb. = 45.36 kilos.		1 yard = 91.44 cm.	
112 lb. = 50.80 kilos.		1 mile = (1,760 yds.) = 1609.35 cm.	
1 long or English ton	= 2,240 lb.	1 sq. inch = 6.4516 sq. cm.	
	= 1,016 kilos.	1 sq. foot = 0.0929 sq. metre.	
1 short ton	= 2,000 lb.	1 sq. yard = 0.6361 sq. metre.	
	= 907.2 kilos.	1 stone = 14 lb. = 6.3503 kilos.	
1 metric ton	= 1,000 kilos.		
	= 2,204.6 lb.	1 millimetre = 0.03937 inch.	
	= 0.9842 gross ton.	1 centimetre = 0.3937 inch.	
	= 1.1023 short tons.	1 meter = 39.37 inches	
1 kilos = 2.2046 lb.		= 3.2808 feet.	
100 kilos = 220.46 lb.		1 kilometre = 0.62137 miles.	
1 maund (i.e., Bengal maund)	= 82½ lb.	= 1,093.6 yards.	
	= 37.5 kilos.	1 sq. mm. = 0.00155 sq. inch.	
1 quintal = 100 kilos = about 225 lb.		1 sq. cm. = 0.155 sq. inch.	
or 2.6 mds.		1 sq. meter = 10.7639 sq. ft.	
		= 1.196 sq. yds.	

Inch.	mm.	mm.	Inch.
0.006	= 0.15		
0.008	= 0.20		
0.010	= 0.25	0.01	= 0.0003937
0.015/16	= 0.40	0.04	= 0.0015748
0.020	= 0.50	0.1	= 0.003937
0.024	= 0.60	0.5	= 0.0019685
0.028	= 0.70	4	= 0.15
0.032	= 0.80	25	= 1
0.036	= 0.90		
0.040	= 1.00	550	= 39½
0.056	= 1.40	570	= 22½
0.060	= 1.50	1000	= 39½
0.080	= 2.00	1030	= 40½
0.120	= 3.00	1070	= 42

\* 1 pound troy (for gold, silver, jewellery, etc.) is equal to 12 oz. or 373.242 grammes.

## CURRENCIES

Approximate equivalent based on exchange Re. 1 = 1s. 6d. sterling.

Country.	Coin.	Approximate.
United States	.. Dollar	= 4s. 1½d.
Argentina	.. } Argentine	= 19s. 10d.
	.. } Peso	= 4s.
Brazil	.. Milreis	= 2s. 3d.
Bolivia	.. Boliviano	= 2s.
Germany	.. Reich Mark	= 11½d. to 1s.
France and Suisse	.. Franc	= 9½d.
Italy	.. Lira	= 9½d.
Norway, Sweden and Denmark	.. Kroner	= 1s. 1½d.
Netherlands	.. Fulden (florin)	= 1s. 8d.
Belgium	.. Franc	= 9½d.
Austria	.. Kronen	= 10d.
Russia	.. Rouble	= 2s. 1½d.
Spain	.. Pasetas	= 1s. 9½d.
Portugal	.. Escudo	= 4s.
Madagascar	.. ..	French currency
Rumania	.. Leu	= 9½d.
Japan	.. Yen	= 1s. 0¾d.

## APPENDIX IV.

## TARIFFS ON MICA.

United Kingdom.—Mica not mentioned in the tariff; presumably free.

Canada.—Mica is not specifically included in the Canadian Customs Tariff but comes under general item No. 711. See p. 146.

Belgium.—Mica crude in sheets, plates or rough mica—free. Mica in leaves, sheets or cut,

for electrical machinery—5 per cent. *ad valorem*.

for stores, shades, fans, etc., and sheets for machinery other than electrical—5½ per cent. *ad valorem*.

others—17½ per cent.

Great Britain.—Mica is free.

Germany.—(i) Raw mica, raw plates or discs—free. (ii) Artificially coloured or ornamented cut sheets of mica—10 marks on every 100 kilos. Uncoloured or undecorated cut sheets—2½ marks per 100 kilos.

Czechoslovakia.—Ores free, mica plates (glimmer and mikanit platten)—21 Czech crowns (for most favoured nations) per 100 kilos. Manufactures of mica (glimmer-und mikanit warin)—

(i) Combined with "ordinary" materials—512.5 Czech crowns with 3 per cent. tax.

(ii) Combined with "fine" materials—1,080.0 Czech crowns plus 13 per cent. tax.

Sweden.—Mica crude—free. Manufacture of mica free.

Holland.—Mica not mentioned in the Tariff; presumably free.

Denmark.—Duty of 3 per cent. *ad valorem*.

Madagascar.—3 per cent. export duty on a valuation fixed by government.

Netherlands.—Mica blocks and splittings admitted free. Micanites—3 per cent.

Italy.—In lump, powder or scales—free. For imports of mica or scale, no duty. Mica in plates unworked or merely cut—free. Surtax 2.50 per cent. *ad valorem*.

Switzerland.—Mica raw or in squares, not cut out—per quintal, 30 cents. In squares or sheets, cut out or in frames combined or not with tissues, metals, etc.—5 francs. Not pierced or otherwise worked, per 100 kilos—8 francs. Worked, per 100 kilos—30 francs. Wares of mica not otherwise specified, even combined with paper.

Australia.—Crude mica in slab—20 per cent. *ad valorem*. Mica and manufactures thereof—30 per cent. *ad valorem* plus a primage duty of 2½ per cent. *ad valorem*. Mica not mentioned in the tariff; presumably free as "other earths and mineral substances, not specifically mentioned, crude, burnt, ground or washed" (Item No. 110B).

New Zealand.—Mica from British countries free and from foreign countries—25 per cent. *ad valorem* plus 9/40ths surtax. No export tax.

Spain.—Mica schist or works even with parts made of other materials: *First tariff*, 80 pasetas per 100 kilos. *Second tariff*, 20 pasetas gold per 100 kilos. *Second tariff* is always applied.

United States.—Dealt with on p. 146.

France.—Import duty on sheets or plates of mica, articles of mica, micanite or compressed mica, micaceous paper or cloth even mixed with other material.

Mica in regular morsels, standard size, shape or of specific forms weighing up to 5 grammes per unit—48 per cent. *ad valorem*. Others per 100 kilos—800 francs\* net weight†.

Japan.—Mica and manufactures thereof, not otherwise provided for—

- (a) In slab or powder—free.
- (b) (i) In sheets, uncoloured or unornamented—free.
- (ii) Others—*ad valorem* 25 per cent.
- (c) Sheets glued together or mica glued on tissue paper, etc.—100 kin ‡ 38.10.
- (d) Others—*ad valorem* 20 per cent.

India.—No export duty on any mica sent out of India.

\* 1,000 grammes equal to 1 kilogram or 2.2046223 lb.

† Mica from Madagascar free from duty.

‡ Kin equal to 160 momme, equivalent to 1.32277 lb. avoird., or 1.60754 lb. troy.

**APPENDIX V.**  
*NEMA\* specifications for standard mica splittings (muscovite).*

NEMA grade.	Standard commercial grading.	Size.	Thickness in inches per 10 films.	Manufacture.	REMARKS.
	E. M. 4-10 : muscovite splittings.				
A	No. 5—1st quality B. F.; P. F.; loose with powder; loose.	Standard No. 5† commercial grading (3 in. to 7½ sq. in.).	0-007 0-009	Must be evenly split to specified thickness; no thick edges or corners; absolutely clean cut films.	Must be clean films; sound muscovite mica; free from all spots and stains.
B	No. 5½—1st quality B. F.; P. F.; loose with powder.	Standard No. 5½ commercial grading (1½ in. to 2½ sq. in.).	0-007 0-009	Same as A .. ..	Same as A.
C	No. 5½—2nd quality; loose with powder; loose.	Do.	0-007 0-010	Evenly split to thickness and, as above, but edges may be slightly uneven.	Same as A.
D	No. 6—1st quality; loose with powder; loose.	At least 60 per cent. of splits to be full standard No. 6 (1 to 1½ sq. in.), balance to pass over ½-in. mesh screen.	0-007 0-009	Same as A .. ..	Same as A.
E	No. 6—2nd quality ..	At least 50 per cent. of splits to be full standard No. 6, balance to pass over a ½-in. mesh screen.	0-007 0-010	Same as C .. ..	Must be clean films; sound muscovite mica containing not more than 5 per cent. slightly weathered or earth-stained films. No mineral stains permissible.
F	No. 6—3rd quality; loose ..	Splittings shall be of a minimum area of ¾ sq. in. and should pass over a ½-in. mesh screen.	0-008 0-012	Same as C .. ..	Must be clean films; sound muscovite mica containing not more than 7½ per cent. slightly weathered or earth-stained films. No mineral stains.

\* National Electrical Manufacturers Association of the United States. Adopted standard 8th December, 1932.

† No. 5 grade should be large enough to cut rectangular pieces measuring 1½ by 2, 2 by 2 and 2 by 2½ inches, etc., and thus, instead of total area, rectangular area in each grade is to be looked for.

APPENDIX V—concl'd.

NEMA grade.	Standard commercial grading.	Size.	Thickness in inches per 10 films.	Manufacture.	REMARKS.
	E. M. 4-15 : phlogopite (amber) splittings.				
M	No. 4—1st quality B. F.; P. P.; loose with powder; loose.	No. 4 standard grading (6 to 9 $\frac{1}{2}$ sq. in.).	0-007 0-009	Must be evenly split to specified thickness; no thick edges or corners; absolutely clean cut films.	Must be free from stone or other mineral inclusions and must withstand heat of 300 degree C. without becoming puffy.
N	No. 5—1st quality B. F.; P. P.; loose with powder; loose.	No. 5 standard grading (3 to 5 $\frac{1}{2}$ sq. in.).	0-007 0-009	Same as M .. ..	Same as M.
O	No. 6—1st quality; loose with powder; loose.	At least 60 per cent. of splits to be full standard No. 6*, balance passable over $\frac{1}{2}$ -in. mesh screen.	0-007 0-009	Same as M .. ..	Same as M.
P	No. 6—2nd quality; loose ..	At least 50 per cent. of splits to be full standard No. 6, balance passable over $\frac{1}{2}$ -in. mesh screen.	0-007 0-009	Evenly split to thickness and as above, but edges may be slightly uneven.	Same as M.

\* 1 to 1 $\frac{1}{2}$  sq. in.



**APPENDIX VI(b).**  
*Approximate average prices of India ruby mica in foreign markets.*

	UNITED KINGDOM. (Per lb. in sterling, ex-warehouse.)										HAMBURG.* (Per lb. in sterling.)			UNITED STATES. (Duty paid per lb. in dollars)			
	1913-14		1919-20		1929-30		1932-33		1937		1914	1920	1933	1929	1933-34	1936	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.				
<b>Special grade:</b>																	
CLSS.	13 6	to 16 0		37 0	24 0	to 28 0		..	..	..	16 6	60 0	43 2	7-20-13-58	8-29	12-64	
F.S.	..	..		26 0	19 0	to 20 0		..	17 6	..	13 9	45 0	28 9	6-25	6-79	10-54	
G.S.	..	..		..	..	14 0		..	..	..	..	..	..	..	6-04	8-40	
Std.	..	..		16 0	12 9	to 24 0		..	..	..	9 7	24 0	17 3	4-85	5-29	7-54	
B.S.	..	..		16 0	10 6	to 19 0		6 0	to 7 9	..	..	..	..	..	2-22	2-29	
<b>A-1 grade:</b>																	
CLSS.	10 7	26 0	to 28 0		..	24 0		..	17 6	30 0	to 35 0	12 10	42 0	28 9	4-50-5-50	6-79	3-94
F.S.	8 1	16 0		..	14 0	to 20 0		..	..	21 0	to 28 0	10 7	25 0	20 2	4-85-5-85	5-44	6-04
G.S.	..	..		..	12 9	to 13 0		..	..	13 0	to 15 0	8 1	16 0	15 7	..	5-29	5-89
Std.	..	..		16 0	10 6	to 19 0		6 0	to 7 9	..	..	..	..	..	5-10	4-09	4-84
B.S.	..	..		10 6	8 0	to 11 6		6 0	to 7 9	..	..	..	..	..	2-50	2-14	2-21
<b>No. 1 grade:</b>																	
CLSS.	8 9	to 9 3	20 0	to 30 0	19 0	to 20 0	14 0	to 16 0	25 0	to 30 0	10 8	34 0	23 0	5-0-5-75	4-24	8-44	
F.S.	8 0	16 0	to 18 0	12 6	to 13 0	11 0	to 11 6	14 0	to 18 0	9 3	20 0	13 3	3-0	3-64	4-09		
G.S.	..	..		11 6	to 12 0	9 0	to 9 9	12 0	to 13 0	..	..	..	..	3-12	3-09		
Std.	6 6	to 7 4	12 0	to 13 0	10 6	to 11 0	9 0	to 9 0	11 0	to 12 0	7 4	12 0	9 9	2-75	2-89	3-34	
B.S.	..	..	10 6	8 0	to 8 6	4 9	to 6 0	..	..	..	..	..	..	2-05	1-99	2-06	
<b>No. 2 grade:</b>																	
CLSS.	7 4	to 8 3	15 0	to 19 0	16 0	to 17 9	12 0	to 14 0	18 0	to 22 0	9 3	30 0	18 5	4-20	3-49	6-94	
F.S.	7 0	13 6	9 6	to 10 6	9 0	to 9 6	6 6	to 8 6	12 0	to 16 0	7 4	19 0	10 4	2-30	2-74	3-04	
G.S.	..	..	9 0	to 9 6	6 6	to 8 6	10 0	to 11 0	..	..	..	..	..	..	2-59	3-14	
Std.	5 9	9 6	to 10 0	8 0	to 8 6	6 0	to 7 0	8 0	to 10 0	6 0	10 0	6 4	2-15	2-14	2-44		
B.S.	..	..	..	6 6	3 8	to 4 10	..	..	..	..	..	..	..	1-80	1-47	1-54	
<b>No. 3 grade:</b>																	
CLSS.	6 9	to 7 9	12 0	to 16 0	..	16 0	11 0	to 11 6	17 0	to 20 0	7 9	26 0	14 0	3-60-3-80	2-89	5-14	
F.S.	5 3	10 6	7 6	to 9 0	5 3	to 6 0	10 0	to 15 0	8 0	to 12 0	6 9	16 0	8 1	1-50-1-85	2-29	2-89	
G.S.	..	..	6 9	to 7 3	5 0	to 5 6	7 0	to 9 0	..	..	..	..	..	1-45	1-99	2-74	
Std.	3 6	6 9	6 0	to 6 6	4 8	to 5 0	7 0	to 9 0	6 8	6 6	6 4	1-18-1-50	1-62	1-84			
B.S.	..	..	3 9	to 4 3	3 0	to 3 3	..	..	..	..	..	..	..	0-90-0-95	0-99	1-09	

\* *Vide* Mr. Richard Schroeder's leaflet on Mica and Mica Products, printed in 1933, by H. S. Hermann, Berlin, S.W.19.

## APPENDIX VI(c).

Approximate prices of Indian splittings in foreign markets.

	London and Continent. (Prices per lb. in sterling.)								America. (Duty paid New York in dollars.)	
	1929-30		1932-33		1937		1929	1932		
<i>ook Splittings—</i>										
No. 4 ..	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.			0.93-1.20	
No. 4½ ..	5 3 to 5 6	4 4	3 4 to 3 9	4 3	4 6 to 5 6	5 0 to 6 0			1.08	
No. 5-1st quality ..	3 6 to 5 0	4 4	2 9 to 3 0	4 4	4 0 to 4 3	4 0 to 4 3	0.90-0.96		0.83	
No. 5-2nd quality ..	3 0 to 4 0	4 0	1 10 to 2 1	3 0	3 0 to 3 6	3 0 to 3 6	0.65-0.90		0.75	
No. 6-1st quality ..	2 4 to 3 0	3 0	1 10 to 2 0	2 0	2 0 to 2 6	2 0 to 2 6	0.60-0.64		0.50-0.60	
No. 6-2nd quality ..	..	..	..	..	1 6 to 2 0	1 6 to 2 0	..		..	
<i>ss Splittings—</i>										
No. 3 P. P. ..		5 3	..	..	..	..	0.40		..	
No. 4 ..	3 9 to 4 3	4 3	..	..	..	3 0	1.00		..	
No. 4½ ..	3 6 to 4 6	4 6	..	..	..	3 3	0.90		..	
No. 5 extra spl. ..	2 9 to 3 0	3 0	2 0 to 2 3	2 3	2 9 to 3 0	3 0	0.75		..	
No. 5 special ..	2 6 to 2 10	2 10	1 9 to 1 11	1 11	2 0 to 2 6	2 6	0.60-0.72		..	
No. 5 "O" and 5½ ..	1 10 to 2 4	2 4	..	..	1 10 to 2 0	2 0	0.48-0.64		..	
No. 5 sq. p. ..	2 0 to 2 7	2 7	..	..	..	..	..		..	
No. 6 extra spl. ..	1 4 to 1 6	1 6	..	..	..	..	..		..	
No. 6 special ..	0 10 to 1 0	1 0	..	..	1 0 to 1 3	1 3	..		..	
No. 6-A ..	0 8 to 0 10	0 10	..	..	0 10 to 0 11	0 11	..		..	
<i>ust Loose Splittings—</i>										
No. 4 ..	..	..	..	..	3 9 to 4 0	4 0	..		..	
No. 4½ ..	..	..	..	..	3 0 to 3 6	3 6	..		..	
No. 5 special ..	..	..	..	2 0	2 6 to 3 0	3 0	..		..	
No. 5 ordinary ..	..	..	1 2 to 1 6	1 6	1 6 to 2 2	2 2	..		..	
No. 5½ ..	..	..	1 2 to 1 6	1 6	..	..	..		..	
No. 6-1st quality ..	..	..	..	0 11	0 10 to 0 11	0 11	..		..	
No. 6-2nd quality ..	..	..	..	..	1 0 to 1 4	1 4	..		..	
<i>ose Splittings—</i>										
No. 3 ..	..	..	..	2 6	..	..	..		..	
No. 4 ..	..	..	1 9 to 2 7	2 7	..	..	..		..	
No. 5 ..	..	..	..	1 0	2 3 to 2 6	2 6	0.60		0.75	
No. 5½ ..	..	..	..	..	1 6 to 2 0	2 0	0.36-0.38		0.45	
No. 6 extra spl. ..	0 10½ to 1 0	1 0	..	..	1 2 to 1 4	1 4	0.24-0.26		0.35	
No. 6 S. C. ..	0 9 to 0 9½	0 9½	..	..	0 9½ to 0 10½	0 10½	..		0.23-0.25	
No. 6-1st quality ..	0 7 to 0 8	0 8	..	..	0 7½ to 0 8½	0 8½	0.20-0.30		0.175	
No. 6-2nd quality ..	0 6 to 0 7	0 7	..	..	0 5 to 0 6	0 6	0.13-0.15		0.13	
No. 6 cheap ..	0 5 to 0 6	0 6	..	..	0 4 to 0 4	0 4	0.09-0.11		0.10	

## APPENDIX VI(d).

Maximum price of Bengal ruby mica blocks in January 1918.  
(as fixed by British Ministry of Munitions, London).

Grade.	Size (area).	PRICES PER LB. IN STERLING, EX. WAREHOUSE.										Fixed prices for splittings.		
		Clear Govt. stand.	Part stained Govt. stand.	2nd quality clear.	2nd quality part stained.	F. S.	Ordinary stained (rust and clay).	Densely stained.	B. S.	Soft white.				
		<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	
Extra Ex. Spl.	Over 70 sq. in.	30	0	25	0	23	6	22	6	21	0	20	0	
Ex. Special	60-70	23	0	21	0	20	0	19	0	18	0	17	0	
Special	48-59 $\frac{1}{2}$	21	6	19	0	18	3	17	6	16	6	15	6	
A-1	36-47 $\frac{1}{2}$	20	0	17	6	17	0	16	6	15	6	14	6	
1	24-35 $\frac{1}{2}$	17	6	15	0	14	9	14	3	13	0	12	0	
2	14-23 $\frac{1}{2}$	16	0	13	6	13	0	12	6	10	6	9	6	No. 4 up—4s. 9d.
3	10-13 $\frac{1}{2}$	12	0	11	0	10	6	10	0	9	6	8	6	" 5 (white)—3s. 3d.
4	6-9 $\frac{1}{2}$	9	0	7	2	7	0	6	6	5	6	4	9	" 5 (other qualities)—2s. 9d.
5	3-5 $\frac{1}{2}$	5	0	4	0	4	5	4	2	3	10	3	0	" 6—1s. 9d.
5. (Govt. std.)	1-2 $\frac{1}{2}$	3	0	2	6	1	9	1	6	1	3	1	0	





*mica (including reclaimed)*

6,026	2,338	5,193	2,956	2,019	3,111	4,026	3,592	3,285	4,829	2,927	3,187	3,689	3,711	2,193	2,740	1,351	1,022	(1)
2,859	457	1,722	2,153	679	1,060	1,080	379	540	1,004	470	478	615	300	..	..	..	..	(1)
3	2	5	7	..	..	1	..	..	..	..	..	..	..	..	..	..	..	(3)
a	a	a	a	a	a	a	..	..	..	..	..	..	..	..	..	..	..	(2)
a	a	a	11,338	11,443	12,324	a	..	..	..	..	..	..	..	..	..	..	..	(1)
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
8,903	2,797	6,920	16,454	14,141	16,435	5,107	3,971	3,825	5,833	3,397	3,665	4,304	4,011	2,193	2,740	1,351	1,022	
12,101	5,484	12,787	21,163	18,768	21,069	8,983	6,050	6,550	10,412	7,245	7,092	6,786	6,544	4,279	5,390	4,873	2,616	

*mica production*

..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	(2)
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
12,101	5,484	12,787	21,163	18,768	21,069	8,983	6,050	6,550	10,412	7,245	7,092	6,786	6,544	4,279	5,390	4,873	2,616		

tion estimated at 10 per cent from 1931 and 20 per cent prior to 1931.

Jour. June 1922).

and 41 tons of scrap.  
 statistics to comprise of 1,500 and 13,367 ong tons of blocks and splittings respectively

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