



## GEMMOLOGICAL REPORT

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**Report Number**  
20080048 / 1 and 2

**Colour**  
red

**Date**  
11 August 2020

**Species**  
Natural corundum

**Item**  
Two faceted gemstones

**Variety**  
Ruby

**Weight**  
1) 3.21 ct  
2) 3.42 ct

**Origin**  
Burma (Myanmar)

**Shape**  
oval

**Condition**  
No indications of heating (NTE).

**Cut**  
brilliant cut / step cut

**Comments**  
See Information Sheet(s).

Important notes and limitations on the reverse.

**Measurements**  
1) 10.42 x 8.03 x 4.07 mm  
2) 10.37 x 8.09 x 4.21 mm

**Transparency**  
transparent



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## Notes and limitations

In keeping with the tradition and high standards of the Gübelin Gem Lab (Gübelin), each Report reflects the findings and independent opinion of Gübelin. Gem testing is carried out by qualified gemmologists applying approved analytical methods and using approved instrumentation. The description given in the Gemmological Report (hereinafter called Report) is limited to a selection of identifying characteristics observed in the gemstones (henceforth including single stones as well). The findings mentioned in this Report reflect the state of the gemstone at the time of examination. The unaltered original of the Report is the only valid document. Mounted stones are tested only insofar as mounting permits. Determination of the measurements of mounted stones cannot, in most cases, match the precision achievable on loose stones. Weight indications for stones tested in a setting are estimates; weight figures indicated by the client are checked by Gübelin. The colour photograph printed on the Report serves merely as an illustration of the items under examination. The actual appearance of the items may differ from their photographic image. The descriptions of jewellery items may be shortened and simplified.

**Origin.** A professional opinion as to the probable geographic origin of a gemstone may be given whenever possible and if requested. Deductions as to geographic origin are based exclusively on the internal characteristics, physical and chemical properties observed by Gübelin staff, by comparison to the properties recorded from reference stones of known identity, the results of continuing research undertaken by Gübelin, and gemmological knowledge published to date. The reference stones mentioned previously are part of the Gübelin gemstone reference collection and are systematically and continuously collected, classified and characterised. Gemstones from different geological sources may reveal a tell-tale combination of characteristic inclusion patterns, absorption spectra and trace-element compositions that allows for the determination of their origin. Indications of origin provided by Gübelin are not a warranty as to the quality or value of the gemstones. They are statements of qualified opinion, and do not guarantee the provenance of particular gemstones. Rather, such statements indicate the most probable origin, based on the data collected for the gemstones tested.

The combination of data may not, in all instances, provide the necessary basis for the determination of a single origin. When such cases arise, the Gübelin Gem Lab does not comment as to the origin of the gemstone. In addition, a determination of the origin of a gemstone reflects the level of knowledge and expertise about the respective type of gemstone at the time of the analysis. As stated above, Gübelin owns a comprehensive collection of authentic and fully analysed samples from all commercially relevant mines worldwide. This is an essential prerequisite for providing credible and reliable origin determination services. However, mines in new areas and other countries are coming on stream, and Gübelin regularly travels to collect sample material from new sources and thoroughly study its characteristics. The gemstones from such new mines can possibly show gemmological characteristics which might overlap with the characteristics of stones from earlier known localities. In such case, the previously defined criteria must be reviewed to ensure the basis for the determination of the origin as described above.

**Padparadscha sapphire.** Definition: Padparadscha sapphire is a variety of corundum from any geographical origin whose colour is a subtle mixture of pinkish-orange to orangey-pink with pastel tones and low to medium saturation. The name Padparadscha sapphire will not be applied (a) if the corundum has any modifier other than pink or orange; (b) if the corundum exhibits major uneven colour distribution when viewed with the unaided eye and the table up  $\pm 30^\circ$ ; (c) in the presence of yellow or orange epigenetic material in fissure(s) affecting the overall colour of the stone; (d) if the corundum has been treated by the lattice diffusion of a foreign element from an external source (see below); (e) if the corundum has glass-filled fissures; (f) if the corundum has been treated by irradiation; (g) if the corundum has been dyed, coated, painted, varnished or spattered.

**Enhancement (Enh.).** Historically, many coloured gemstones have been enhanced to improve their appearance. Enh. is a term used in the trade to describe any process additional to cutting and polishing that improves the appearance or durability of gemstones. Today, a variety of traditional and advanced enh.s (also known as treatments) are routinely applied to many natural gem materials including, but not limited to, beryl, corundum, tourmaline, topaz, zircon, zoisite, etc. Heat treatment (also known as thermal enh.) is commonly applied to gemstones such as rubies and sapphires to improve colour and/or transparency (clarity). Thermal enh. of rubies and sapphires is considered stable and permanent under normal wear and handling conditions, and it is generally accepted by the international gem and jewellery trade.

**Enh. disclosure.** Generally, the wording used in Gübelin Reports is fully compliant with the nomenclature standards defined by the Laboratory Manual Harmonisation Committee (LMHC). On the front of the Report, a comment on the presence or absence of indications of heating will be made for rubies and sapphires. In addition, disclosure will be made when solid substances, representing by-products of the enh. process, are detected in their fissures and/or cavities. Also, disclosure will be made when the colour (or asterism) of a corundum, imitating ruby or sapphire, is confined to a shallow layer that has been artificially induced by diffusion of one or more chemical elements from an external source. When the colour of yellow to orange sapphires is, or may have been, induced or enhanced by high-energy irradiation, a comment is made.

Corundum may be exposed to elevated temperatures. This process is performed to alter the colour and/or clarity of rubies and sapphires. The process may incorporate the use of chemicals such as sodium tetraborate powder, in order to help facilitate the closure of fractures by healing or infilling. Upon exposure to elevated temperatures, the chemicals will melt, coat the surface of the gemstone and enter fractures. There they act as a flux and assist the healing of the fractures. When cooling starts, material melted during the heating process will solidify, in general, as an amorphous solid. Remnants of this material may be encountered at the surface of a polished gemstone and/or may remain trapped within areas of the healed or filled fractures. A similar reaction may take place in rubies and sapphires that have been thermally enhanced without the use of such chemicals. Amorphous solids may result from the thermal alteration and interaction of naturally occurring inclusions within the host gemstone. These by-products may also be encountered in depressions on the surface or within healed fractures.

The term "residue" is used by Gübelin to describe these remnants or by-products of the thermal process. To disclose this information, Gübelin, in collaboration with the LMHC, has developed a progressive system, based on a set of master stones, to classify the varying constituents making up the healed fractures and the amount of such residues that may be present in healed and filled fractures of a thermally enhanced ruby or sapphire.

Gübelin applies the following terms to disclose the presence or absence of indications of treatment, and to grade the relative quantity of residue in fissures:

No indications of heating:	- No indications of heating (NTE).
Indications of heating without residues in fissures:	- Indications of heating (TE).
Indications of heating with minor residues in fissures:	- Indications of heating (TE1-TE2).
Indications of heating with moderate residues in fissures:	- Indications of heating (TE3-TE4).
Indications of heating with significant residues in fissures:	- Indications of heating (TE5).

Gübelin applies the following terms to disclose and grade the presence and relative quantity of residue in cavities:

- Indications of minor amount of residues in cavities (C1).
- Indications of moderate amount of residues in cavities (C2).
- Indications of significant amount of residues in cavities (C3).

It is important to note that this system assesses only the extent (i.e. size, number and position) of the healed fractures and the residue that may be present in healed or filled fractures of a thermally enhanced ruby or sapphire, relative to the size of the gemstone. It does not consider the number or extent of other inclusion features nor the degree to which the colour has been affected. This system is not a classification of quality.

Lattice diffusion of foreign elements such as beryllium or titanium. Any corundum that shows indications of heating accompanied by the introduction/diffusion of a chemical element other than hydrogen from an external source (with the aim of facilitating the modification or creation of colour) shall receive the following comment:

- Indications of heating, colour induced by the diffusion of chemical elements from an external source.

Clarity enh. using oil / resin. In addition to the above, Gübelin discloses on its reports if the fissures in corundum are filled with an organic substance, such as oil or resin, to an extent that it affects the clarity. However, the nature of the organic substance is not specified.

Gübelin applies the following terms to disclose the presence of indications of clarity enh.:

- Indications of minor clarity enh. (F1).
- Indications of moderate clarity enh. (F2).
- Indications of significant clarity enh. (F3)

Lead glass filled fissures. Any corundum that shows indications of having undergone clarity enh. (usually in combination with heating) through the filling of fissures with lead glass will receive the following additional comment:

- Indications of minor clarity enh. with lead glass (F1).
- Indications of moderate clarity enh. with lead glass (F2).
- Indications of significant clarity enh. with lead glass (F3).

The Report does not constitute a guarantee for, or appraisal of, the gemstones described herein. Gübelin assumes no responsibility for any damage or loss, or claims by third parties, which may arise from the issuance, use or misuse of this Report. It is recommended to carefully read the document "General Terms & Conditions" available on our website [www.gubelingemlab.com](http://www.gubelingemlab.com).

Report Verification No.: cdni

## INFORMATION SHEET

to Report No. 20080048 / 1 and 2

### Unheated rubies

Large rubies of gem-quality are rarely found in nature. Not only is a delicate mineralogical balance essential for this red variety of corundum to be formed deep within the earth, but specific geological conditions as well as adequate pressure and temperature must also be present. Furthermore, the sufficient supply of a rare combination of chemical elements, such as aluminium and chromium, are yet another necessity required for the formation of rubies.

Over the past decades, various heating techniques, as well as the use of chemical additives, have been introduced to increase the supply of rubies resembling the high-quality untreated specimens. The aim of these treatments was and still is to improve the visual appearance of the gemstones.

Prior to the advent of modern heating techniques, rough rubies were cut and polished retaining the quality that nature had originally endowed them with. Therefore, in earlier times, rubies with obvious imperfections were considered and accepted as the norm. However, the expectations with respect to quality (colour and transparency) rose steadily.

The demand for natural, unheated rubies kept growing while the supply of such gems remains highly limited, making natural rubies of gem-quality from all major sources, such as Burma (Myanmar), Mozambique, Madagascar, Kenya, Tanzania, Vietnam, Afghanistan and Tajikistan, difficult to find.

Information Sheets are intended to provide information supplementary to the contents of the Report and comment on, for instance, the type of gemstone, the geographic origin and the presence or absence of treatments. By definition, Information Sheets are purely informative in nature; they consist of a standard text and are issued for all types of stones of that particular category. Information Sheets, therefore, do not imply a certain quality or rarity of the stone described in the Gübelin Gem Lab Report which it is attached to.

## INFORMATION SHEET

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### Rubies from Mogok, Burma

Burma has long been recognised as the locality associated with the most desirable rubies in the world. Within Burma (Myanmar), the most famed region is the Mogok Valley, or Mogok Stone Tract, in the Pyin Oo Lwin district, North East of Mandalay: a small area of a few dozen square miles, of which only a portion is gem-bearing. Meanwhile, there are few more small deposits to the north of Mogok, such as Namya, that produce rubies with similar characteristics.

Although it is uncertain when mining first began, accounts indicate that rubies have been sourced in the Mogok area for well over a thousand years.

The earliest surviving records of mining activity began in 1597, when the King of Burma took over the mines. Burmese rubies, especially the ones from Mogok, have since sustained the strongest renown.

Mogok-type rubies typically possess a red body colour and red UV-fluorescence. In addition, they may contain tiny amounts of light-scattering rutile silk and a swirl-like growth pattern. It is this combination of features which gives these rubies their characteristic appearance.

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