

The Colour of the Canadian Flag

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Introduction

As important and ubiquitous as the CIE Standard Observer has become in its 75 years, there may be only one instance where it was used as a direct consequence of an edict from a head of government. Such was the case in 1965 when the Prime Minister of Canada, Lester B. Pearson expressed concern about the considerable variation in the shades of red appearing in specimens of the national flag. He directed that action be taken at once to achieve standardization on the basis of the correct colour.¹

Historical Background

A recent CBC documentary² reports that “In the 1960's Canada was trying to outgrow its colonial adolescence and define itself as a grown-up nation. Nationalism was taking root in Quebec, and a new flag was the most obvious way of demonstrating independence from Britain. But the birth of Canada's flag in 1965 was anything but simple. The flag debate began in the House of Commons in 1964 and carried on for weeks, taking up parliamentary time and bringing the nation's business to a standstill.” Finally, on 15 February 1965, the red maple leaf was flown for the first time as Canada's official flag. After all the turmoil, it was a great disappointment to the supporters of the new flag that it quickly faded to an orange colour on a dirty grey background or even, in some extreme cases, to white on white.

First Standards

The National Research Council (NRC), and in particular Gunter Wyszecki, were called in to help. The task was to select and precisely define the red colour of the flag which was to be printed on 1.9 oz nylon taffeta. The colour was to have the same appearance as the red colour of the old ensign flag which had traditionally been produced on cotton bunting. Consultation with dyestuff manufacturers and laboratory tests carried out at NRC revealed that dyestuffs could be formulated in the desired shade with an excellent degree of light fastness. To facilitate control of the color in flag production, Wyszecki recommended that manufacturers be provided with two limit standards, one a light red showing the orange limit, the other a dark red showing the blue limit.³ The desired shade would be between the two – preferably closer to the darker shade.

For the purpose of a permanent record, the two standards were measured on a General Electric Hardy recording spectrophotometer and CIE colour coordinates were calculated using CIE illuminant C and the CIE 1931 Standard Observer. The results were as follows:

| Sample | x | y | Y(%) |
|---------------------------|-------|-------|------|
| No.1 (light-orange limit) | 0.571 | 0.311 | 10.4 |
| No.2 (dark-red limit) | 0.577 | 0.309 | 8.3 |

^{*} Much of the work described in this paper was performed by the late Gunter Wyszecki.

It is believed that this was the first use of CIE colorimetry for the specification of the colour of a national flag.

1972 Modifications

The 1965 specifications were based on illuminant C and on measurements relative to smoked magnesium oxide. Over the next few years, CIE recommendations changed and it was realized that it would be better to have a specification in terms of the new CIE standard illuminant, D₆₅ and to use measurements relative to the perfect reflecting diffuser as the reference white.⁴ With these changes, the specifications of the two limits became:

| Sample | x | y | Y(%) |
|---------------------------|-------|-------|------|
| No.1 (light-orange limit) | 0.574 | 0.315 | 10.1 |
| No.2 (dark-red limit) | 0.579 | 0.314 | 8.1 |

At the same time, it was decided to recommend a single standard colour with tolerances on each coordinate. On this basis, the specification became:

$$x = 0.576 \pm 0.028$$

$$y = 0.315 \pm 0.012$$

$$Y = 9.5 \pm 1.5$$

In later modifications, the tolerances were changed to be expressed in terms of the CMC (2:1) colour-difference formula⁵ and a specification was added for the white part of the flag.

The complete specification of the flag, including many other factors in addition to colour, is published as a national standard.⁶

References

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3. G. Wyszecki, Specification of Color of Canadian Flag, National Research Council of Canada Memorandum, 20 October 1965.
4. A.R. Robertson, The Colour of the Canadian Flag, National Research Council of Canada Report, PRO-388, September 1972.
5. F.J.J. Clarke, R. McDonald and B. Rigg, Modification to the JPC79 colour-difference formula, *J. Soc. Dyers & Colourists*, **100**, 128-132 (1984). Errata, *J. Soc. Dyers & Colourists*, **100**, 281-282 (1984).
6. CAN/CGSB-98.1-2003, Amendment No. 1, Corrigendum No. 1, *National Flag of Canada (Outdoor Use)*, December 2005.