

# Scorch Glyph vs. Fireball Glyph

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## 1 Introduction

The question presented in this paper concerns glyph choices for a Mage in a heroic raid setting. The question is whether he should use Fireball glyph or Scorch glyph in his third glyph slot. Assumptions for the analysis are limited to a standard Rawr model.

The process of finding the best glyph choice is three steps. In section 1 we compute the total raid damage including Scorch glyph. In section 2 we compute the total raid damage given Fireball glyph. Finally, in section 3 we simply compute the difference of section 2 and section 1. Analysis proceeds in the general case until the penultimate section, Approximations and Conclusions, at which time the author attempts to apply the model to a real fight in order to arrive at the best glyph choice.

## 2 Definitions

First we need to define all our variables and statements to come.

Variable	Explanation
I	Set of all raid members
i	Element of I
DPS <sub>i</sub>	Rawr DPS for raid member i
H	Haste factor for the Mage
T	Given fight length
n <sub>i</sub>	Damage reduction from Scorch's absense

## 3 Scorch Glyph (S.G.) Present

In this case, we compute the total raid damage given that the Mage uses Scorch glyph.

Damage During Scorch Stacking

$$\int_0^{1.5H} \sum_{i=1}^{24} DPS_i - n_i + DPS_{scorch} dt.$$

Damage After Scorch Stacking

$$\int_{1.5H}^T \sum_{i=1}^{24} DPS_i + DPS_{rotation} dt.$$

Total Damage

$$\int_0^T \sum_{i=1}^{24} DPS_i + DPS_{MageW/S.G.} dt - \int_0^{1.5H} \sum_{i=1}^{24} n_i dt. \quad (1)$$

## 4 Fireball Glyph (FB.G.) Present

In this case, we compute the total raid damage given that the Mage uses Fireball glyph.

Damage During Scorch Stacking

$$\int_0^{7.5H} \sum_{i=1}^{24} DPS_i - n_i + DPS_{scorch} dt.$$

Damage After Scorch Stacking

$$\int_{7.5H}^T \sum_{i=1}^{24} DPS_i + DPS_{rotation} dt.$$

Total Damage

$$\int_0^T \sum_{i=1}^{24} DPS_i + DPS_{RawrW/FB.G.} dt - \int_0^{7.5H} \sum_{i=1}^{24} n_i dt. \quad (2)$$

## 5 Effect of Scorch Glyph vs. Fireball Glyph

In this section, we compute the difference of the case in which the Mage uses Fireball glyph and that in which he uses Scorch glyph. If the difference is greater than

zero, Fireball glyph is chosen. If the difference is less than zero, Scorch glyph is chosen.

Damage With Fireball Glyph - Damage With Scorch Glyph

$$\int_0^T DPS_{RawrW/FB.G.} - DPS_{RawrW/S.G.} dt - \int_0^{7.5H} \sum_{i=1}^{24} n_i dt + \int_0^{1.5H} \sum_{i=1}^{24} n_i dt \quad (3)$$

## 6 Approximations and Conclusions

We have now arrived at our full, analytical result, equation 3. However, it is not much use to us, since we would need to do a number of calculations to use it. Since  $n_i$  is a function of time, we would need to do five  $n_i$  computations per person doing damage in the raid.

Fortunately, theoretical damage is fairly tight among classes for our purposes. This means that our  $n_i$ s are all nearly equal to each other. Furthermore, a discerning reader would notice that the first integrand in equation 3 is a thinly disguised  $n_{mage}$  as well. Combining these simplifying assumptions, we can transform equation 3 into something a little more workable:

$$\begin{aligned} (3) &= \int_0^T DPS_{RawrW/FB.G.} - DPS_{RawrW/S.G.} dt - \int_0^{7.5H} \sum_{i=1}^{24} n_i dt + \int_0^{1.5H} \sum_{i=1}^{24} n_i dt \\ &\approx \int_0^T n dt - \int_{1.5H}^{7.5H} 24n dt \\ &= n(T - 24 * 6H) = J, \text{ decision function} \end{aligned}$$

Now it is plainly evident that given our simplifying assumptions, the damage loss from not having Scorch applied is actually not a factor in the final glyph consideration. The decision is a function of only two parameters, namely the fight length T and the Mage's haste factor H. The following table fully summarizes the decision of which glyph to use as a function of the fight length T, given a haste factor of  $\frac{1}{1.1409}$ :

T	Sign of J	Glyph
[0, 126.216)	-	Scorch
126.216	0	Either
(126.216, ∞)	+	Fireball

It is now evident that Fireball glyph is a better choice than Scorch glyph in the case where every member of the heroic raid is a DPS who gains the benefit of Improved Scorch, a situation which gives us a lower bound on the value of  $J$ . Further refinements, such as reformatting the model to work for a nonheroic raid or Improved Scorch to buff only the caster damage dealers in the raid will lower the value of the coefficient of  $H$ , thereby making Fireball glyph more desirable.

The only foreseeable refinement presenting an alteration of the conclusion for fights of length  $> 120$  seconds, is the reformatting of fight length as a function of raid damage. Giving a cursory thought to this refinement, the fight length would need to be shrunk by a number of magnitude 1 to effect a sign change of  $J$ , an unlikely outcome.