

OpenGL[®] ES
Common/Common-Lite Profile Specification
Version 1.1.10 Full Specification
DRAFT (February 6, 2007)

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```
void Enable( enum target );
```

and

```
void Disable( enum target );
```

with *target* equal to RESCALE_NORMAL or NORMALIZE. This requires two bits of state. The initial state is for normals not to be rescaled or normalized.

If the model-view matrix is M , then the normal is transformed to eye coordinates by: ²

$$(n_x' \ n_y' \ n_z' \ q') = (n_x \ n_y \ n_z \ q) \cdot M^{-1}$$

where, if $\begin{pmatrix} x \\ y \\ z \\ w \end{pmatrix}$ are the associated vertex coordinates, then

$$q = \begin{cases} 0, & w = 0, \\ -\frac{(n_x \ n_y \ n_z) \begin{pmatrix} x \\ y \\ z \end{pmatrix}}{w}, & w \neq 0 \end{cases} \quad (2.1)$$

Implementations may choose instead to transform $(n_x \ n_y \ n_z)$ to eye coordinates using

$$(n_x' \ n_y' \ n_z') = (n_x \ n_y \ n_z) \cdot M_u^{-1}$$

where M_u is the upper leftmost 3x3 matrix taken from M .

Rescale multiplies the transformed normals by a scale factor

$$(n_x'' \ n_y'' \ n_z'') = f (n_x' \ n_y' \ n_z')$$

If rescaling is disabled, then $f = 1$. If rescaling is enabled, then f is computed as (m_{ij} denotes the matrix element in row i and column j of M^{-1} , numbering the topmost row of the matrix as row 1 and the leftmost column as column 1)

$$f = \frac{1}{\sqrt{m_{31}^2 + m_{32}^2 + m_{33}^2}}$$

²Here, normals are treated as row vectors and transformed by postmultiplication by the inverse of the transformation matrix. If normals are treated as column vectors, then the transformation would instead be performed by premultiplying the normal by the inverse transpose, $M^{T^{-1}}$.

version 1.1.10, draft of 2007/02/06 Noted in section 2.10.3 that normal vectors are treated as row vectors transformed by matrix postmultiplication, which may be unfamiliar to some graphics programmers. Removed X Window System trademark information from the copyright pages.