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AMENDMENT 1
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**Geometrical product specification
(GPS) — Filtration —**

Part 61:

Linear areal filters — Gaussian filters

AMENDMENT 1

Spécification géométrique des produits (GPS) — Filtrage —

Partie 61: Filtres surfaciques linéaires : Filtres Gaussiens

AMENDEMENT 1



Reference number
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This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This document develops a concept of handling end effects in the case of the linear areal Gaussian filter.

A list of all parts in the ISO 16610 series can be found on the ISO website.

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Geometrical product specification (GPS) — Filtration —

Part 61:

Linear areal filters — Gaussian filters

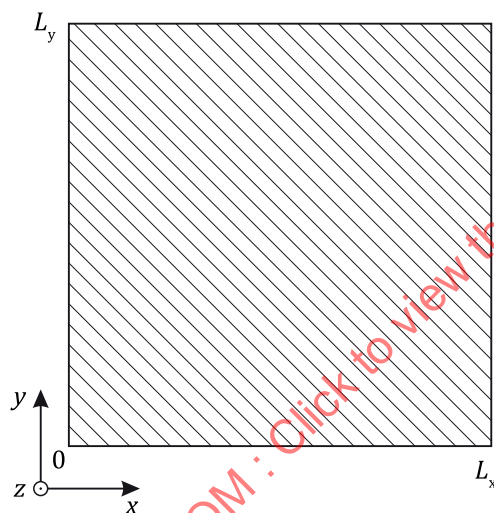
AMENDMENT 1

Add a new Clause 7 after 6.2:

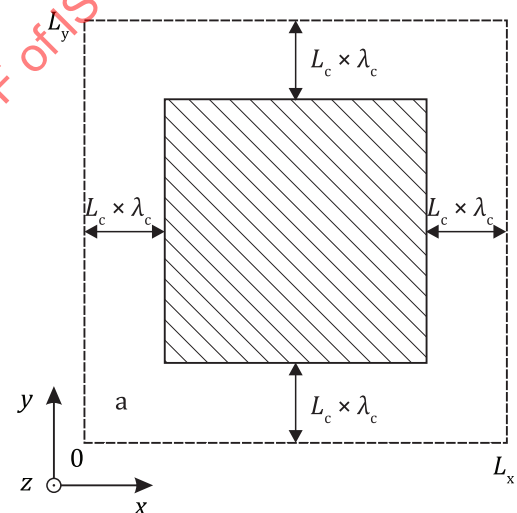
7 Treatment of end effects

7.1 General

Depending on the chosen nesting indices, the filtered surface may be significantly smaller than the unfiltered surface due to end effects (see [Figure 8](#) for linear planar Gaussian filters and [Figure 9](#) for linear cylindrical Gaussian filters). If the end effects require treatment the moment retainment criterion with $p = 1$ shall be applied (see ISO 16610-28).



a) Surface (hatched area) before filtering

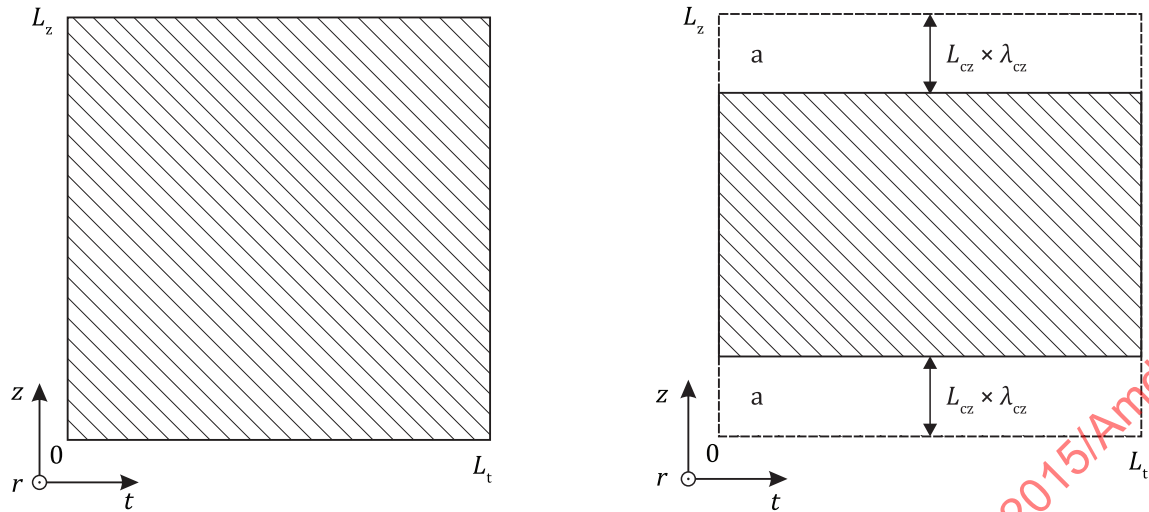


b) Surface (hatched area) after filtering

Key

- a region of end effects
- L_x measuring length in x direction
- L_y measuring length in y direction
- λ_c nesting index (cut off wavelength)
- L_c truncation index
- x, y, z right-handed Cartesian coordinate system

Figure 8 — Region of end effects in case of a linear planar Gaussian filter



a) Surface (hatched area) before filtering

b) Surface (hatched area) after filtering

Key

- a region of end effects
- L_t circumferential measuring length in t direction
- L_z measuring length in z direction
- λ_{cz} nesting index (cut off wavelength) in z direction
- L_{cz} truncation index in z direction
- t, z, r right-handed Cartesian coordinate system

Figure 9 — Region of end effects in case of a linear cylindrical Gaussian filter

7.2 Generalized filter operation for linear planar Gaussian filters

For linear planar Gaussian filters, the generalized filter operation is defined by [Formula \(19\)](#):

$$w(x, y) = \int_{\Omega_x} \int_{\Omega_y} z(x-u, y-v) \times (b_{00}(x, y) + u \times b_{10}(x, y) + v \times b_{01}(x, y)) \times s(u|\lambda_c) \times s(v|\lambda_c) dvdu \quad (19)$$

where

- u is the integration variable in x direction;
- v is the integration variable in y direction;
- $\Omega_x = [\max(x - L_x, -L_c \lambda_c), \min(x, L_c \lambda_c)]$ is the integration interval in x direction;
- $\Omega_y = [\max(y - L_y, -L_c \lambda_c), \min(y, L_c \lambda_c)]$ is the integration interval in y direction;
- $b_{00}(x, y), b_{10}(x, y), b_{01}(x, y)$ are the shift variant correction functions.

The shift variant correction functions shall be calculated by solving the matrix formula: