Special Product Identification & Volume (m^3) Calculation Reference

Automated analysis (ChatGPT)

22 January 2026

1 Executive summary

This report documents (1) how "special products" were identified and filtered from the provided datasets, and (2) the geometry logic used to calculate volume in cubic meters (m^3) for each special shape code.

2 Source files and outputs

2.1 Inputs

- `Code Rule AND Product list -1 (new 2025).xlsx`
  - Worksheet `Mã NVL, SP, Gia công`: provides the authoritative list of special-shape codes (column `Ký hiệu.2`).
  - Worksheet `DANH MUC SP`: product master list used to detect special products by product-code suffix.
- `output.csv`: transactional/line-level dataset containing `Product__r.StockKeepingUnit` and quantities.

2.2 Generated outputs

- `special_products_filtered.csv` and `special_products_filtered.xlsx`: all rows from `output.csv` classified as special products, with added columns `special_code` and `special_shape`.
- `special_products_DANH_MUC_SP.xlsx`: all rows from worksheet `DANH MUC SP` classified as special products, with added columns `special_code` and `special_shape`.

2.3 Dataset sizes

Dataset	Rows	Notes
`output.csv`	3301	1100 unique SKUs
Filtered special rows (from `output.csv`)	100	60 unique SKUs
`DANH MUC SP` worksheet	526	product master list
Filtered special rows (from `DANH MUC SP`)	31	special products in master list

In `output.csv`, special products represent 3.0% of rows and 5.5% of unique SKUs. In `DANH MUC SP`, special products represent 5.9% of rows.

3 Special-product definition (authoritative code list)

The worksheet `Mã NVL, SP, Gia công` defines "Sản phẩm đặc biệt" (special products) via the following codes:

Code	Vietnamese name	English interpretation
L	Cắt chữ L	L-shape / L-profile
U	Cắt chữ U	U-shape / channel profile
G	Cắt góc độ	Angle cut / chamfer (degree cut)
C	Cắt vòng cung	Arc cut / rounded corner
K	Lỗ khoan	Drilled hole
T	Hình trụ	Cylinder
B	Đá bộ	Set / kit (multiple pieces)
V	Đá vành	Ring / annulus / ring-step stone

4 Filtering methodology

4.1 Filtering special products in `output.csv`

Primary key. The detection key is the SKU field `Product__r.StockKeepingUnit`.

Observation. SKUs in `output.csv` follow a structured pattern that typically includes a dash ("-") separating a prefix (stone/finish family) from a dimension and feature segment. Special-shape markers appear in this segment.

Rule.

1. Split SKU on the first dash and take the substring to the right (the "dimension segment").
2. Assign a `special_code` if the dimension segment contains a recognized special marker.
3. **Important precedence to avoid false positives:** for U-profiles, the dimension segment commonly contains `UL`, `UR`, or `UT` (direction/variant markers). These include the letters `L` and/or `T`, but should be classified as `U`. Therefore, U-profile detection is evaluated before standalone `L` or `T` detection.
4. If a `special_code` is assigned, the row is kept as a special product.

Implementation note. The resulting exports include two added columns:

- `special_code`: one of {L,U,G,C,K,T,B,V}
- `special_shape`: a human-readable label (Vietnamese + brief English hint)

4.2 Filtering special products in `DANH MUC SP`

For the master list worksheet `DANH MUC SP`, special products are indicated by a suffix character in `Mã sản phẩm`. The detection used:

1. Take the last character of `Mã sản phẩm`.

2. If it is in {L,U,G,C,K,T,B,V}, classify the row as a special product and assign `special_code`.

5 Results

5.1 Results for `output.csv`

A total of 100 rows were classified as special products, corresponding to 60 unique SKUs.

Code	Vietnamese name	English interpretation	Rows	% of special	Unique SK
L	Cắt chữ L	L-shape / L-profile	11	11.0%	
U	Cắt chữ U	U-shape / channel profile	22	22.0%	
G	Cắt góc độ	Angle cut / chamfer (degree cut)	2	2.0%	
C	Cắt vòng cung	Arc cut / rounded corner	6	6.0%	
K	Lỗ khoan	Drilled hole	0	0.0%	
T	Hình trụ	Cylinder	6	6.0%	
B	Đá bộ	Set / kit (multiple pieces)	36	36.0%	
V	Đá vành	Ring / annulus / ring-step stone	17	17.0%	

Key finding: Code `K` (Lỗ khoan) did not appear in the provided `output.csv`.

5.2 Results for `DANH MUC SP`

In the worksheet `DANH MUC SP`,

6 Volume (m^3) calculation reference

6.1 Units and conventions

All formulas below assume inputs are in meters. If source dimensions are in millimeters (mm) or centimeters (cm), convert first:

$$L_m = \frac{L_{mm}}{1000} \quad \text{or} \quad L_m = \frac{L_{cm}}{100},$$

and similarly for width (W), height/thickness (H), radii (r), and diameters (d).

6.2 Baseline: rectangular prism

For a standard rectangular block:

$$V = L\,W\,H.$$

6.3 L — Cắt chữ L (L-shape)

Two common interpretations are used in practice:

(A) L-profile cross-section ("wrap") extruded along length. Let L be the run length, a the tread (horizontal leg), b the riser (vertical leg), and t the wall thickness. The cross-section area is:

$$A = ta + tb - t^2,$$

and the volume is $V = L\,A$.

(B) L-shape in plan view (two rectangles joined) with uniform thickness. If plan area is the union of two rectangles minus overlap:

$$A = (L_1 W_1) + (L_2 W_2) - (L_o W_o),$$

then $V = A\,H$.

6.4 U — Cắt chữ U (U-profile / channel)

Let L be length, outer width W, outer height H, and wall thickness t. Inner dimensions are:

$$W_{in} = W - 2t, \qquad H_{in} = H - t.$$

Cross-section area:

$$A = WH - W_{in}H_{in},$$

and volume $V = L\,A$.

6.5 G — Cắt góc độ (angle cut)

If one corner of a rectangle is cut away by a right-triangle of legs a and b (in plan view), removed area is:

$$A_{cut} = \frac{1}{2}ab.$$

Then:

$$V = (LW - A_{cut})\,H.$$

6.6 C — Cắt vòng cung (arc / rounded corner)

If a quarter-circle of radius r is removed from a corner (plan view), removed area is:

$$A_{cut} = \frac{\pi r^2}{44}.$$

Then:

$$V = (LW - A_{cut})\,H.$$

More generally, for a sector of angle θ degrees: $A_{cut} = \pi r^2 \left(\frac{\theta}{360}\right)$.

6.7 K — Lỗ khoan (drilled hole)

Compute the base volume and subtract cylindrical holes. For n holes of diameter d and hole depth h:

$$V = LWH - n\left(\pi\left(\frac{d}{2}\right)^2 h\right).$$

If the hole is through-thickness, use $h = H$.

6.8 T — Hình trụ (cylinder)

Solid cylinder. For diameter d and height h:

$$V = \pi \left(\frac{d}{2}\right)^2 h.$$

Hollow cylinder (pipe). With outer radius R_o and inner radius R_i:

$$V = \pi(R_o^2 - R_i^2)h.$$

6.9 B — Đá bộ (set / kit)

A set is a sum of component volumes. If a set contains pieces $i = 1 \dots k$ with per-piece volume V_i and quantity q_i:

$$V_{\text{set}} = \sum_{i=1}^{k} V_i q_i.$$

Total volume for N sets: $V_{\text{total}} = N\, V_{\text{set}}$.

6.10 V — Đá vành (ring / annulus)

For a full ring (annulus) with outer radius R_o, inner radius R_i, and thickness H:

$$V = \pi(R_o^2 - R_i^2)H.$$

For a partial ring (arc) spanning θ degrees:

$$V = \pi(R_o^2 - R_i^2)H \left(\frac{\theta}{360}\right).$$

7 Known data gaps and recommendations

- Several U-profile lines in `output.csv` have missing height/thickness fields. A reliable m^3 calculation for U-profiles requires the missing profile depth and wall thickness (or a drawing/specification reference).
- Some SKUs contain multiple letters that could be interpreted as special markers (e.g., `UL` or `UT`); ensure extraction logic uses context/precedence so that direction markers do not override the intended special code.
- For `B` (set) products, m^3 should be calculated from the bill of materials (piece list) rather than any single dimension string.

A Appendix: practical extraction pseudocode

```
For each row in output.csv:
  sku = Product__r.StockKeepingUnit
  dim = substring_after_first_dash(sku)

  if dim contains "U" immediately followed by L/R/T (e.g., UL, UR, UT): code="U"
```

```
else if dim contains "B": code="B"
else if dim contains "V": code="V"
else if dim contains "L": code="L"
else if dim contains "C": code="C"
else if dim contains "G": code="G"
else if dim contains "K": code="K"
else if dim contains "T" (or "(T)"): code="T"
else: code=None

keep row if code is not None
```