Tech Design Spec – Risk Vault Engine

Product: Risk Vault Engine (Audit ZIP Generator for CBAM Filing)

Version: v1.0

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1. PURPOSE

The Risk Vault Engine consolidates all audit-relevant artifacts from a CBAM declarant’s quarterly report—spanning supplier fallback memos, XML schema filings, verifier readiness, and outreach logs—into a secure, compliant ZIP bundle per declarant per filing. This serves as a compliance audit record under Article 6 of the EU CBAM Regulation.

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2. INPUT STRUCTURE

Trigger requires all of the following:

- cbam\_report.xml (from Express Fix)

- cbam\_audit.pdf (QC output from Default Audit Engine)

- supplier\_effort\_log.pdf (from Sprint Pack)

- default\_memo.pdf (optional fallback memo)

- verifier\_precheck.pdf (optional; generated if available)

System Inputs:

- Declarant EORI

- Quarter + Year of filing

- Declarant-specific storage bucket via UploadThing/Supabase

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3. OUTPUT STRUCTURE

ZIP Bundle:

- /cbam\_report.xml

- /cbam\_audit.pdf

- /supplier\_effort\_log.pdf

- /default\_memo.pdf (if generated)

- /verifier\_precheck.pdf (if generated)

- /README.md → Metadata manifest

README.md Contents:

- Declarant EORI

- Filing Quarter + Year

- SHA256 hash of ZIP contents

- Timestamp of generation

- Missing optional files noted explicitly

Filename Convention:

CBAM\_AuditBundle\_{EORI}\_{YYYY}\_Q{N}\_v1.zip

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4. CORE MODULES

4.1 Bundle Trigger:

- Triggered once Express Fix XML + QC PDF + Log PDF exist

- UI switch also allows regeneration

- Version counter appended if multiple ZIPs generated for same quarter

4.2 File Fetcher:

- Pulls files from product-specific buckets

- Confirms file presence, format, non-zero content

- Skips optional PDFs with warning flag

4.3 Hashing & Integrity Check:

- SHA256 ZIP checksum created

- Logged to internal metadata registry

- Matched during download integrity confirmation

4.4 GDPR Expiry Engine:

- ZIPs deleted after 30 days unless downloaded

- Download resets expiry timer

- Audit log (vault\_zip\_created, vault\_zip\_downloaded, vault\_zip\_deleted)

4.5 ZIP Generator:

- All valid files packed into bundle

- README auto-generated

- ZIP locked against re-bundling unless regenerated via override

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5. NON-FUNCTIONAL REQUIREMENTS

5.1 GDPR Compliance:

- No personal or emissions data persisted outside required artifacts

- Supplier data anonymized in logs

- Metadata-only logs retained

- Hosted on EU servers

5.2 Redundancy Prevention:

- Engine locks bundle after creation

- Regeneration requires explicit flag

5.3 Audit Assurance:

- Verifier checklist included when available

- Manual override allowed to skip if file unavailable

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6. API ENDPOINTS (INTERNAL)

- POST /risk-vault/trigger

- GET /risk-vault/download/{eori}/{quarter}

- GET /risk-vault/status/{eori}/{quarter}

- DELETE /risk-vault/expire-old

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7. ANALYTICS EVENTS

- vault\_zip\_created

- vault\_zip\_downloaded

- vault\_zip\_deleted

Metrics Captured:

- Time to bundle (ms)

- Storage consumed (MB)

- Regenerations (count)

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8. EDGE CASES HANDLED

- Missing optional files → noted in README, bundle proceeds

- Duplicate ZIP for same quarter → versioned ZIP name

- Declarant downloads but loses ZIP → allow re-trigger

- Manual upload by declarant → log mismatch notice

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9. STORAGE & SECURITY

- EU-based ZIP hosting (UploadThing, S3 EU-West)

- ZIPs auto-deleted after 30d (unless accessed)

- Only metadata logs stored

- Optional encryption-at-rest via S3 policies

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10. DEPENDENCIES

- CBAM Express Fix output

- Default Audit PDF

- Supplier Sprint Log + Default Memo

- Verifier Readiness Export (future-ready)

- UploadThing, Supabase, or AWS S3

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11. OWNER

- Product Owner: Filentra Founder

- Engineering Integration: TBD

- Legal/GDPR: Confirmed compliant