TECHNICAL WHITEPAPER · 2026 EDITION

Vanadium Pentoxide
V_2O_5

Applications, grade selection and supply-chain control — a procurement reference for ferrovanadium producers and chemical manufacturers.

From raw ore to flakes: what determines batch performance, and what buyers should verify before the container is sealed.

Part One

What V_2O_5 is used for

Four industrial roles, and why two of them tolerate a broader impurity window than the others.

Part Two

98% versus 99%

What the extra purity point costs, what it buys, and the two questions that settle the choice.

Part Three

Ore to sealed container

Six supply-chain stages, the three control points that decide batch quality, and how to verify them.

ZhenAn International Co., Limited

Ferroalloy production and export · 30+ years

Two production bases · 30,000 m² · 150,000 t annual output

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ISO 9001:2015 quality system

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What this document covers

This whitepaper consolidates three technical briefings — on V2O5 applications, on 98% versus 99% grade selection, and on the supply chain from ore to flake — into a single procurement reference. Sections 1–3 establish what the material is and which grade fits which process. Sections 4–6 address where quality is actually won or lost, and how to verify it before shipment.

01 **What vanadium pentoxide is** *Definition, position in the value chain, physical form* 4

02 **Industrial applications** *Ferrovanadium, sulfuric acid catalysis, selective oxidation, regeneration* 5

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Who this is written for

PRIMARY READERS

1. Procurement and sourcing managers at ferrovanadium smelters
2. Technical buyers at steel mills and foundries
3. Chemical and catalyst manufacturers specifying high-purity feed

WHAT YOU SHOULD BE ABLE TO DO AFTERWARDS

1. Match a grade to a downstream process, not to a price list
2. Name the three control points that decide batch quality
3. Write a purchase order that can actually be verified

A NOTE ON FIGURES

Impurity limits, prices and shipment volumes are commercial variables that change with ore source, contract terms and market conditions. This document therefore frames specifications as **tolerance windows and verification obligations** rather than fixed numbers. Always contract against the measured values on the batch certificate of analysis, not against the nominal grade name.

EXECUTIVE SUMMARY

Five findings that change how V2O5 is bought

Vanadium pentoxide sits at the narrow waist of the vanadium value chain. Everything upstream — ore grade, slag chemistry, roasting and leaching practice — converges into a flake that must meet a specification, and everything downstream — ferrovanadium, steel, sulfuric acid, specialty chemicals — inherits whatever variability survives that convergence.

1. **V2O5 is a conversion node, not a commodity endpoint.** Flakes are the primary feedstock for FeV50 and FeV80, which steel mills use to raise tensile strength, wear resistance and grain refinement. The same flakes feed catalyst production for sulfuric acid and selective oxidation. Quality lost here cannot be recovered downstream.

2. **98% and 99% are engineering choices, not a quality ladder.** The difference is minimum V2O5 content *plus* tighter limits on iron, silicon, sulfur and phosphorus. 98% is the standard feedstock for commercial ferrovanadium smelting; 99% earns its premium where trace metals directly degrade a catalyst or a high-purity synthesis route.

3. **Most failures are procedural before they are chemical.** The recurring failure modes are off-spec vanadium content, excessive fines, elevated trace metals, and moisture pickup in transit — each traceable to a control gap rather than to geology.

4. **Three control points decide the batch.** Raw-material traceability and multi-sourcing; in-process control under an ISO 9001:2015 system with batch-level testing; and pre-shipment verification through an in-house laboratory plus third-party inspection such as SGS.

5. **Contract on documents, not on grade names.** A purchase order that does not require a batch certificate of analysis, a packing list and inspection reports is a purchase order that cannot be enforced at the receiving dock.

98.0%	99.0%	4	2
MINIMUM V2O5 STANDARD GRADE	MINIMUM V2O5 HIGH-PURITY GRADE	VERIFICATION GATES BEFORE LOADING	DOWNSTREAM ROUTES ALLOY & CHEMICAL

THE ONE-LINE VERSION

Choose the lowest grade that satisfies your downstream tolerance, then buy that grade from a supplier who can prove — batch by batch, on paper and by third-party inspection — that what was loaded is what was specified.

How the three briefings combine into one decision sequence

Read in sequence, the three articles answer the buyer's questions in order — each answer constraining the next.

STEP 01 · APPLICATION

What does the material do?

Alloy feedstock or catalyst. This single answer sets the tolerance band that everything else must respect.

STEP 02 · SPECIFICATION

Which grade meets it?

98% or 99%, in flake or powder. The tolerance band from step 01 becomes a contractual limit here.

STEP 03 · SUPPLY CHAIN

Who can prove it, batch by batch?

Sourcing traceability, process control and pre-shipment verification — where the specification is kept or lost.

SECTION 01

A dark red crystalline compound at the centre of the chain

Vanadium pentoxide is an inorganic compound of vanadium and oxygen in a 2:5 ratio. Industrially it is traded as a dark red to orange crystalline flake, and it performs two very different jobs: it is the raw material from which ferrovanadium is smelted, and it is an oxidation catalyst in its own right.

Position in the value chain

The compound occupies the space between raw-material extraction and finished alloy or chemical production. Vanadium-bearing ore, slag or secondary sources are roasted and leached to produce a vanadium-rich solution; that solution is precipitated as ammonium metavanadate or a similar intermediate; the intermediate is calcined under controlled atmosphere; and the result is formed into flakes of defined purity.

Those flakes then split into two industries. On the metallurgical side they are reduced with aluminium or silicon in an electric furnace to produce FeV50 and FeV80, which steel mills consume to enhance tensile strength, wear resistance and grain refinement. On the chemical side they become the active phase in catalysts for sulfuric acid production and selective oxidation reactions.

The consequence for buyers is direct: any disruption, contamination or quality variation upstream propagates into downstream alloy and chemical performance. Supply-chain awareness is therefore a procurement function, not a courtesy.

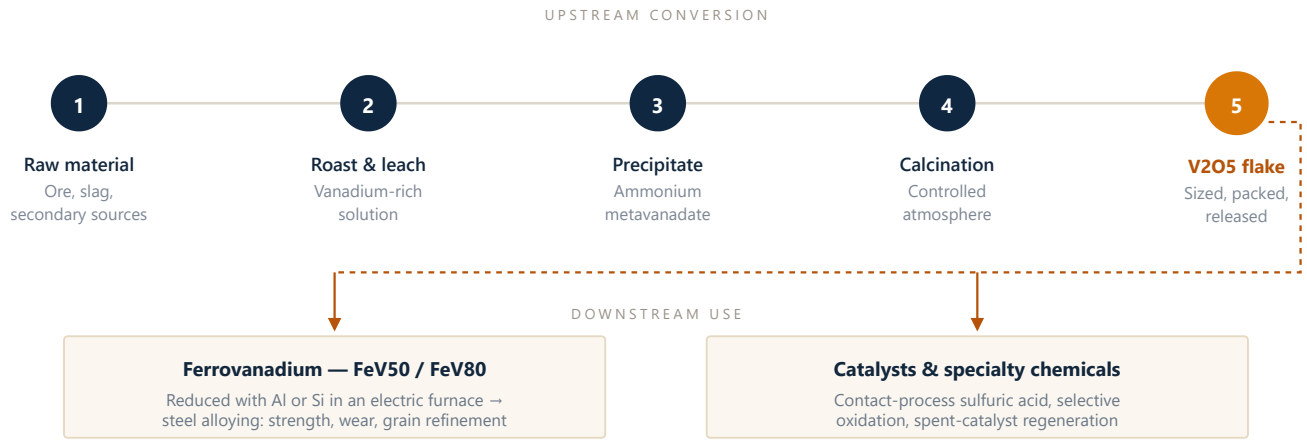


Figure 1. The vanadium value chain — V2O5 flake is the single point where ore chemistry becomes a specifiable, tradeable product.

PROCUREMENT CONSEQUENCE

Because the flake stage is a conversion node, the specification you write is a **contract on the whole upstream process**. Two suppliers offering "V2O5 98%" are not offering the same material unless their raw-material sources and process control are comparable.

SECTION 02

Four industrial roles, two very different tolerances

Vanadium pentoxide plays four commercial roles. Two of them are metallurgical and tolerate a broader impurity window; two are chemical and are damaged by trace metals. Understanding which role your process plays is the precondition for choosing a grade.

1. Ferrovanadium feedstock — the volume application

Flakes are reduced with aluminium or silicon in an electric furnace to produce ferrovanadium alloys such as FeV50 and FeV80. The alloy is then added to steel to improve tensile strength, wear resistance and grain refinement. This is the largest single use of V_2O_5, and the one where consistent vanadium content and low fines matter more than the last decimal of purity.

A common and costly misunderstanding deserves stating plainly: **V_2O_5 flakes cannot be charged directly into a steel furnace.** They must first be converted into ferrovanadium through reduction smelting before they function as an alloying agent. Buyers who short-cut this step do not obtain a cheaper alloy; they obtain a metallurgical problem.

2. Sulfuric acid catalyst — the purity-critical application

V_2O_5 catalyses the conversion of sulfur dioxide to sulfur trioxide in the contact process, the basis of large-scale sulfuric acid manufacturing for fertiliser, mineral processing and chemical industries. Here the material is not consumed as a raw material but functions as an active phase whose surface area, particle size and trace-metal profile determine conversion efficiency.

3. Selective oxidation — the selectivity-critical application

In specialty chemical production, V_2O_5 promotes controlled oxidation reactions that yield high-value intermediates without excessive by-product formation. Because selectivity is the economic variable, ultra-low trace metals and reproducible catalyst behaviour matter more than unit price.

4. Catalyst regeneration — the activity-restoration application

In the petroleum and chemical sectors, V_2O_5 is used to regenerate spent catalyst material, restoring activity and extending the operational life of industrial catalyst systems. This application is more forgiving than fresh catalyst manufacture: adequate activity restoration, not maximum purity, is the requirement.

WHERE BROAD TOLERANCE IS ACCEPTABLE

1. Ferrovanadium smelting (FeV50 / FeV80)
2. Spent-catalyst regeneration
3. Any process where impurity carry-over is diluted by furnace chemistry

WHERE TIGHT TOLERANCE IS MANDATORY

1. Sulfuric acid catalyst manufacture
2. Selective oxidation and specialty synthesis
3. Any catalyst bed where Fe, Si, S or P act as poisons

Mapping application to grade and physical form

The same compound is bought in different forms for different reasons. Grade and physical form are separate decisions, and both must appear on the purchase order.

Application	Typical grade	Key requirement	Physical form	Dominant risk
Ferrovanadium smelting	V2O5 98% or 99%	Consistent vanadium content, low impurities, controlled fines	Flakes	Off-spec V content; fines losses in the furnace
Sulfuric acid catalyst	V2O5 99%	High surface area, controlled particle size, low trace metals	Powder or flakes	Catalyst poisoning; loss of conversion efficiency
Chemical synthesis	V2O5 99%	Ultra-low trace metals, high purity, batch-to-batch reproducibility	Powder	Selectivity drift; by-product formation
Catalyst regeneration	V2O5 98%	Adequate activity restoration	Flakes	Incomplete reactivation

Source: consolidated from the three ZhenAn technical briefings on V2O5 applications and grade selection. Grade names indicate minimum V2O5 content; actual impurity limits are supplier- and batch-specific and must be confirmed on the certificate of analysis.

The real cost of choosing the wrong row

Grade mismatch produces three distinct failure patterns, and only one of them shows up on the invoice:

- **Over-specification.** Buying 99% for standard steel alloying pays a premium for purity the furnace cannot use. The loss is visible immediately — as a higher unit cost per ton of alloy.
- **Under-specification in catalyst service.** Feeding 98% material into a catalyst duty introduces trace metals that shorten bed life. The loss is invisible at purchase and arrives months later as reduced conversion efficiency.
- **Form mismatch.** Flake-sized material specified where a controlled-particle powder is required forces an extra milling step, generates dust losses, and shifts surface-area control out of the supplier's hands and into yours.

> **PRACTICAL RULE**
>
> Match the grade to your **end-use tolerance**, not to the lowest-cost quote and not to a default habit. The correct question is not "what is the best V2O5?" but "what is the cheapest material that will still meet my downstream specification on every batch?"

What the supplier must be able to answer

Before any quotation is comparable, three questions should be on the table: does the certificate of analysis report vanadium pentoxide content against your furnace or process tolerance; does the supplier control particle size and physical form within a declared range; and can the batch be traced back to a production date and a raw-material source. A supplier who cannot answer all three is quoting a price, not a specification.

SECTION 03

V2O5 98% versus 99%: what the label actually buys

These are the two most common industrial purity grades of vanadium pentoxide flake. The difference lies not only in minimum vanadium pentoxide content but in production method, impurity profile and end-use suitability. Choosing the wrong grade produces off-spec ferrovanadium batches, excess production cost, or refinement steps that should have happened at the supplier.

V2O5 98% — THE WORKHORSE

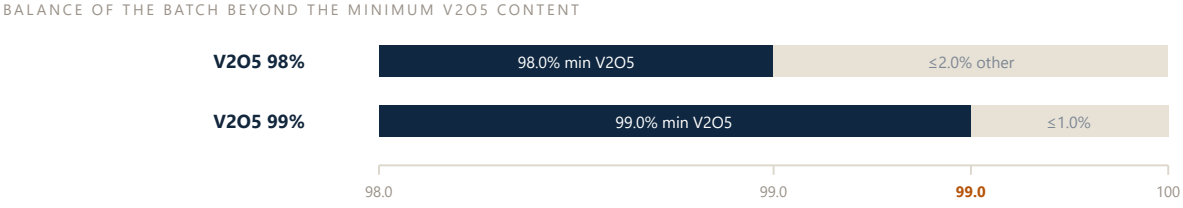
Minimum 98.0% V2O5. Broader tolerance windows on Fe, Si, S and P. Typically produced from standard vanadium slag, accepting a wider raw-material base. The standard feedstock for commercial FeV50 and FeV80 smelting.

V2O5 99% — THE CRITICAL-DUTY GRADE

Minimum 99.0% V2O5. Lower allowable limits on Fe, Si, S and P. Requires more selective raw materials or additional refining, tighter oxidation control, and more extensive trace-element testing before release.

Parameter	V2O5 98%	V2O5 99%	Practical meaning
Minimum V2O5 content	98.0%	99.0%	One point more headroom before a batch fails spec
Iron (Fe), max	Broader limit	Tighter limit	Smelting tolerance vs. chemical purity
Silicon (Si), max	Broader limit	Tighter limit	Standard grade vs. high-purity processes
Sulfur (S), max	Broader limit	Tighter limit	General use vs. poison-sensitive duty
Phosphorus (P), max	Broader limit	Tighter limit	Steel alloying vs. catalyst feed
Raw material base	Standard vanadium slag	Selective feed or extra refining	Supply flexibility and lead time
Process control	Standard windows	Tighter oxidation control	Reproducibility across shipments
Laboratory verification	Standard criteria	Stricter trace-element panel	What you are able to audit
Packaging	Standard moisture protection	Moisture-controlled	Arrival condition after ocean freight
Primary use	Ferrovanadium	Catalyst and specialties	Whether the premium is recoverable

Impurity rows are relative limits: absolute values are supplier-specific and belong on the batch certificate of analysis, never on a grade name alone.



Illustrative, derived from minimum V2O5 content only. Actual trace-metal limits are tighter than this residual and are set per supplier specification.

Figure 2. The difference is not one point of purity — it is a halving of the residual allowance in which Fe, Si, S and P must fit.

Why 99% costs more: four production differences

The premium on high-purity material is the price of four additional controls, each consuming capacity or yield:

- **Raw material selection.** V2O5 99% demands more selective vanadium-bearing feed or additional refining to reach lower trace-metal content. 98% accepts a broader raw-material base within specification limits and is typically produced from standard vanadium slag. Narrower feed means fewer eligible ore sources — a supply-risk consideration as much as a cost one.
- **Roasting and calcination control.** Both grades pass through roasting of slag or ore, but 99% requires tighter temperature and atmosphere control during oxidation to minimise residual impurities and stabilise crystalline structure — narrower operating windows and less tolerance for process upsets.
- **Laboratory verification.** 99% undergoes more extensive chemical analysis for trace elements such as iron, silicon, sulfur and phosphorus, with each batch checked against stricter acceptance criteria before release. This is the cost that most directly benefits the buyer: it is what makes the certificate of analysis meaningful.
- **Packaging and handling.** Because of higher purity and stricter specification, 99% typically uses more rigorous moisture-controlled packaging to preserve chemical integrity over long ocean freight.

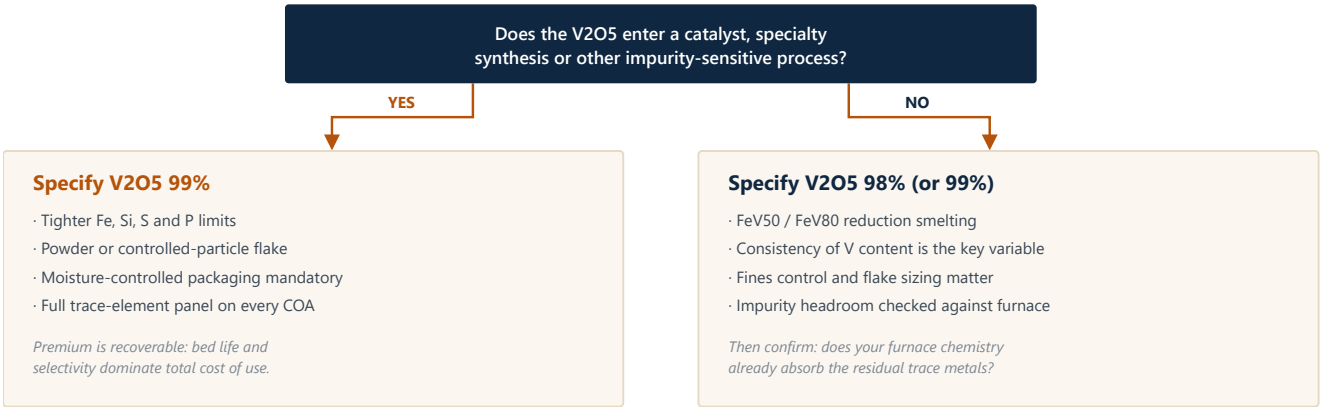


Figure 3. A two-question grade screen. The second question is the one most often skipped — and the one that decides whether 99% is necessary or merely expensive.

Three considerations that decide the grade in practice

1. **Match the grade to the end-product specification.** FeV50 and FeV80 can typically be produced from V2O5 98%. Applications requiring ultra-low impurities — chemical catalysts in particular — may specify V2O5 99%.
2. **Request a pre-shipment certificate of analysis for every batch.** Verify that actual vanadium content and impurity levels meet your furnace or process tolerance, regardless of the nominal grade — the only protection against off-spec material at the dock.
3. **Confirm supplier testing capability.** A reliable exporter operates an in-house laboratory for batch-level analysis and provides third-party verification from accredited bodies such as SGS. Documentation consistency across shipments indicates process discipline.

> **ON THE 99% QUESTION IN STEEL ALLOYING**
>
> For standard steel alloying, 98% typically delivers adequate purity at standard unit cost. 99% becomes advantageous only when trace-impurity control directly affects final product quality — a decision for the furnace metallurgist, not the purchasing spreadsheet.

SECTION 04

From raw ore to sealed container

The supply chain spans multiple stages from ore extraction to finished flake delivery. Each stage introduces variables that affect final product quality, batch consistency and material availability. A single weak link can translate into elevated impurities, off-spec vanadium content, or shipment delays that ripple through downstream steel production.

#	Stage	What happens	Quality lever	Typical failure mode
01	**Raw material sourcing**	Vanadium-bearing ore, slag or secondary sources are selected and blended	Geological origin and grade set the baseline impurity profile	High silica, iron or sulfur feed forces heavier refining; single-source dependency risks interruption
02	**Roasting and leaching**	Vanadium is oxidised and dissolved into a vanadium-rich solution	Roasting temperature and leaching efficiency	Incomplete conversion leaves vanadium in residue — recovered as lower yield, not lower price
03	**Precipitation**	Vanadium is precipitated as ammonium metavanadate or a similar intermediate	Precipitation chemistry and liquor purity	Impurities co-precipitate and carry through to calcination
04	**Calcination**	The intermediate is calcined under controlled atmosphere to form V2O5	Temperature and atmosphere control	Unstable crystalline structure; residual impurities retained
05	**Flake forming and packing**	Product is formed, sized and packed to specification	Sizing discipline; moisture barrier integrity	Excessive fines; packaging that admits moisture
06	**Logistics and delivery**	Container loading, ocean freight, port handling, discharge	Sealed drums or moisture-resistant liners; loading standards	Hygroscopic degradation; compromised container seals

Stages 01–05 are supplier-controlled. Stage 06 is jointly controlled — which is why receiving-end inspection is part of procurement, not part of warehousing.

Reading the chain as a risk map

Not every stage deserves the same attention. Stages 01 and 06 are where buyer leverage is highest, because both are verifiable before money moves: raw-material traceability can be documented and audited, and packaging integrity can be inspected at the loading port and again at discharge. Stages 02–04 are the supplier's process, and the buyer's only realistic instrument is the quality system behind it — which is precisely why ISO 9001:2015 certification and batch-level lab data deserve as much weight in supplier selection as price.

Stage 05 is the quiet one. Flake sizing and fines content rarely appear in commercial negotiations, yet they determine how much vanadium actually reaches the furnace rather than the dust collector. A specification that fixes chemistry but leaves sizing undefined has closed only half the loop.

> **THE COMPOUNDING EFFECT**
>
> Supply-chain defects do not average out. Impurities introduced at stage 01 and not removed at stage 04 arrive at the smelter as a chemistry problem the buyer cannot fix — only reject. This is why the cheapest available flake is frequently the most expensive material in the furnace.

Raw material sourcing and ore quality

The geological origin and grade of vanadium-bearing raw materials determine the baseline impurity profile of the final product. Ores with higher silica, iron or sulfur content require more intensive refining to meet V2O5 98% or 99% specifications. This is not a detail that can be engineered away at the calcination stage; it is a constraint set before the material arrives at the plant.

Buyers should therefore ask three specific questions of any supplier: where their raw material comes from, whether they maintain multiple sourcing channels to ensure supply continuity, and how they manage impurity variability across different ore batches. A supplier who cannot describe batch-to-batch variability has not measured it.

Processing and refining control

Roasting temperature, leaching efficiency, precipitation chemistry and calcination conditions all influence the crystalline structure and chemical purity of V2O5 flakes. Inconsistent process control produces exactly the defects that are expensive to discover late: off-spec vanadium content, excessive fines, elevated trace metals.

Suppliers with in-house laboratories and ISO 9001:2015-certified quality systems are better positioned to detect and correct process deviations before shipment, and they can document batch-level test data for buyer review. The certification matters less as a badge than as evidence that testing happens at multiple production stages — from raw-material intake through finished-product dispatch — rather than only at the end.

Logistics and delivery integrity

V2O5 flakes are hygroscopic and can degrade if exposed to moisture during transit or storage. Proper packaging with moisture barriers, container loading standards and port handling procedures protect material integrity from production facility to destination.

Buyers in humid climates such as Southeast Asia should confirm that suppliers use sealed drums or moisture-resistant liners, and should inspect container seals on arrival to verify packaging integrity. Two checks are worth institutionalising: a seal number recorded on the shipping documents and matched at discharge, and a visual inspection of drum condition before the container is emptied into the warehouse.

3	2	1	0
CONTROL POINTS THAT DECIDE BATCH QUALITY	LABS: IN-HOUSE AND THIRD-PARTY	DOCUMENT SET PER SHIPMENT	RECOVERY OPTIONS AFTER ACCEPTANCE

WHY THE FOURTH NUMBER IS ZERO

Once a container is accepted and unloaded, the commercial position on quality shifts decisively toward the buyer. Inspection is cheap before acceptance and expensive afterwards. This single asymmetry justifies every verification step described in Section 06.

SECTION 05

Making quality auditable

A quality claim that cannot be documented is a claim, not a specification. The difference between a reliable V2O5 supplier and an inexpensive one is usually visible in the paperwork before it is visible in the material.

Four pillars of supplier quality evidence

1. **Production capacity sufficient for consistent monthly volumes.** Interrupted supply is a quality event in its own right — it forces substitute material into a furnace tuned for another chemistry.
2. **ISO 9001:2015 certification covering intake to dispatch.** The scope matters more than the certificate: it should span raw-material intake through finished-product dispatch, not a single warehouse activity.
3. **In-house laboratory capability for batch-level chemical analysis before every shipment.** Routine analysis is what makes a certificate of analysis a measurement rather than a template.
4. **Documented export experience to steel-producing regions** — Japan, South Korea, Germany, Brazil, India, Southeast Asia and the Middle East. Freight, packaging and documentation requirements differ across these destinations, and experience is the cheapest way to inherit that knowledge.

The document set that should accompany every shipment

Document	What it must contain	What it protects against
Certificate of analysis	Vanadium pentoxide content plus Fe, Si, S and P values for the specific batch, referenced to production date	Off-spec material accepted without recourse
Packing list	Package count, net and gross weight, packaging type, seal numbers	Shortage and packaging disputes
Third-party inspection report	SGS verification upon request, tied to the same batch	Divergence between in-house data and independent analysis
Batch traceability record	Production date, raw-material source reference, release approval	Unresolvable quality complaints after the fact

Packaging: the specification that is not on the certificate

Because V2O5 flakes are hygroscopic, packaging is a chemical control, not a logistics preference. Sealed drums or moisture-resistant liners, standardised container loading, and disciplined port handling protect the material from plant to destination. For humid destinations, moisture-controlled packaging should be written into the purchase order as a requirement, not assumed as a default.

> **TESTING, IN ONE SENTENCE**
>
> Purity is determined by chemical analysis of vanadium pentoxide content and trace-element levels. Reputable suppliers test every batch in an in-house laboratory and offer third-party verification — and they share the results before shipment, not after a complaint.

SECTION 06

Four verification gates before the container sails

The following sequence converts the preceding analysis into an operating procedure. Each gate has an owner, an artefact and a stop condition. Gates 1 and 2 are commercial; gates 3 and 4 are technical.

1. **Verify raw-material traceability.** Ask whether the supplier can document the origin and typical composition of their vanadium-bearing feedstock, and confirm that they maintain backup sourcing options to manage supply disruptions. *Stop if the answer is anecdotal.*

2. **Request process control documentation.** Confirm operation under an ISO 9001:2015 quality system with batch-level testing at multiple production stages, from raw-material intake through finished-product dispatch. *Stop if certification scope excludes production.*

3. **Compare pre-shipment inspection protocols.** Ensure third-party verification from accredited bodies such as SGS is available and that the supplier maintains an in-house laboratory for routine analysis. Insist on reviewing the certificate of analysis before each shipment leaves the loading port. *Stop if the COA is issued after loading.*

4. **Plan storage and handling at the receiving end.** Coordinate with your warehouse team on sealed-container handling and moisture-controlled storage to preserve flake integrity after arrival. *Stop if no one owns discharge inspection.*

Supplier scorecard

Criterion	Evidence to request	Red flag
Raw-material control	Feedstock origin, typical composition, list of sourcing channels	Single unnamed source; no data on batch variability
Quality system	ISO 9001:2015 certificate with scope statement	Certificate scope limited to trading or warehousing
Batch testing	Sample COA showing V2O5 and Fe/Si/S/P per batch	COA without batch or production date reference
Third-party option	SGS or equivalent inspection arrangement	Refusal or unexplained surcharge
Capacity	Monthly tonnage availability, base area, production lines	Volume commitment without a delivery schedule
Packaging	Drum type, liner specification, seal control, loading standard	Open-top or unlined packaging for humid destinations
Export record	References in target regions; documentation samples	No verifiable shipment history to comparable markets

SEQUENCING NOTE

Gates 1 and 2 can be completed from documents in a single supplier review session. Gates 3 and 4 require agreement before the first order — retrofitting an inspection requirement into an existing supply relationship is significantly harder than writing it into the initial purchase order.

SECTION 07

Questions buyers actually ask

Consolidated from the three source briefings and de-duplicated. Technical answers are intentionally short; where a number is required, it must come from your supplier's batch documentation.

Q What is vanadium pentoxide used for?

Primarily as a raw material for ferrovanadium production, and as an industrial catalyst in sulfuric acid manufacturing and selective oxidation processes. It is also used to regenerate spent catalyst material in the petroleum and chemical sectors.

Q What is the role of V2O5 in the ferrovanadium supply chain?

It occupies the central position between upstream raw-material extraction and downstream alloy production. V_2O_5 flakes are the primary feedstock for FeV50 and FeV80, which steel mills use to enhance tensile strength, wear resistance and grain refinement.

Q Can V2O5 flakes be used directly in a steel furnace?

No. Flakes must first be converted into ferrovanadium through reduction smelting before they function as an alloying agent in steel.

Q What is the main difference between V2O5 98% and V2O5 99%?

V_2O_5 99% contains a minimum of 99.0% vanadium pentoxide with lower trace-impurity limits; V_2O_5 98% contains a minimum of 98.0% with slightly broader impurity tolerances. The gap is a halving of the residual allowance within which Fe, Si, S and P must fit.

Q Can V2O5 98% be used for all ferrovanadium grades?

Yes. V_2O_5 98% is the standard feedstock for producing FeV50 and FeV80 in most commercial ferrovanadium smelting operations.

Q Is V2O5 99% worth the higher specification for steel alloying?

For standard steel alloying, 98% typically delivers adequate purity at standard unit cost. 99% becomes advantageous when trace-impurity control directly affects final product quality — catalyst duty being the clearest case.

Q How does raw material quality affect flake specifications?

The geological origin and grade of the vanadium-bearing raw materials determine the baseline impurity profile of the final product. Ores with higher silica, iron or sulfur content require more intensive refining to meet 98% or 99% specifications.

Q How are V2O5 flakes tested and released?

By chemical analysis of vanadium pentoxide content and trace-element levels, batch by batch. Reputable suppliers test every batch in an in-house laboratory, offer third-party verification, and share the results before shipment rather than after a complaint.

Q What form is V2O5 supplied in, and is it solid or liquid?

Industrial V_2O_5 is supplied as a solid — dark red or orange flakes, or powder for catalyst applications — typically packed in steel drums or containers depending on order volume and destination.

Q Why is moisture protection critical during transit and storage?

V_2O_5 flakes are hygroscopic and degrade if exposed to moisture. Sealed drums, moisture barriers and standardised container loading protect material integrity from production facility to destination.

Q What documents should accompany a shipment?

A certificate of analysis showing vanadium content and impurity levels, a packing list, and third-party inspection reports from accredited bodies such as SGS upon request. Batch traceability data should be available on demand.

Q What should buyers verify when selecting a supplier?

Raw-material traceability, ISO 9001:2015 certification with production in scope, in-house laboratory capability for batch-level analysis, third-party SGS verification options, and documented export experience to steel-producing regions.

ABOUT THE PRODUCER

ZhenAn International Co., Limited

We produce and export V2O5 98% and 99% flakes, ferrovanadium and related ferroalloys from two production bases totalling 30,000 m². With annual output exceeding 150,000 tons and more than 30 years of ferroalloy manufacturing experience, we supply vanadium pentoxide to ferrovanadium producers, steel mills and chemical manufacturers across Japan, South Korea, Germany, Brazil, India, Southeast Asia and the Middle East.

Every batch is checked by our in-house QC team and can be verified by SGS on request. ISO 9001:2015 certification covers the process from raw-material intake to finished-product dispatch, and batch-level test data is available for buyer review before shipment.

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TECHNICAL DATA

V2O5 flake specifications on request

HOW A QUOTATION IS BUILT

01 · YOU SEND

Grade, volume, application and destination port. A furnace or process description helps more than a grade name alone.

02 · WE CONFIRM

Recommended grade and form, a sample certificate of analysis, packaging specification and a delivery schedule.

03 · BEFORE LOADING

Batch COA and packing list released for review, with SGS verification arranged on request.

SOURCE DOCUMENTS AND METHOD

This whitepaper synthesises three technical briefings published by ZhenAn International: *Vanadium Pentoxide Supply Chain: From Raw Ore to Flakes for Ferrovanadium Production*; *V2O5 98% vs 99%: Difference Explained for Buyers*; and *What Is Vanadium Pentoxide (V2O5) Used For? Industrial Applications Explained* (all October 2026). Material has been reorganised by procurement function rather than by article, with overlapping FAQ content de-duplicated, qualitative statements preserved, and numeric impurity limits deliberately left to supplier specification sheets where the source did not state them.

Disclaimer. This document is provided for technical and commercial orientation. It does not constitute a product specification, a warranty of fitness for a particular purpose, or an offer. Grade suitability depends on the buyer's furnace chemistry, catalyst bed design and downstream product specification. Final acceptance criteria must be established between buyer and supplier in the purchase contract, and verified against the batch certificate of analysis. Health, safety and transport requirements for vanadium compounds are governed by applicable regulations in the destination jurisdiction and are outside the scope of this paper.