Tungsten Carbide Scrap Specification — Mixed Hard Carbide (WC-Co)

Material category: Mixed hard tungsten carbide (WC-Co hardmetal)

Mixed hard tungsten carbide scrap: unsegregated sintered WC-Co (cemented carbide / hardmetal) components from multiple industrial origins, traded on a lot-by-lot basis after inspection and any agreed analysis.

Mixed hard carbide is the broadest tungsten scrap category in the trade: unsegregated sintered WC-Co components arriving as a single stream. This specification sets out how the material is described, what determines its commercial standing, and what must be agreed contractually rather than assumed.

Material description

Mixed hard carbide describes sintered cemented carbide arisings that have not been separated into single-application streams. The material is a composite: tungsten carbide (WC) grains cemented by a metallic binder — most commonly cobalt, sometimes nickel, and in some corrosion-resistant grades a nickel-chromium binder. Because it is a sintered composite rather than an alloy, it cannot be characterised by a single alloy designation the way a stainless or aluminium grade can.

A mixed lot typically arrives from a collector who has aggregated carbide from several generators: a machine shop's insert bin, a tool room's ground-out rejects, a maintenance department's worn wear parts, and occasionally offcuts from a carbide stockist. The pieces are chemically related but metallurgically diverse. Binder fraction, additional cubic carbides (titanium, tantalum, niobium), grain size and coating type all vary between pieces in the same drum.

Typical material forms

- Indexable inserts, both uncoated and coated, in mixed geometries and sizes
- Solid round tooling — worn drills, end mills, reamers, burrs and unground rod ends
- Wear components — nozzles, bushings, guides, seal faces and strip
- Dies, punches and forming tooling, sometimes still pressed into steel casings
- Broken and chipped fragments produced when brittle carbide fails in service
- Brazed-tip tooling where the carbide remains attached to a steel body

Specification table (typical characteristics)

Material category	Mixed hard tungsten carbide scrap (cemented carbide / WC-Co hardmetal)
Material form	Unsegregated sintered carbide: inserts, round tooling, wear parts, dies, fragments, brazed items
Primary recoverable material	Tungsten, recovered as tungsten carbide or tungsten compounds depending on the processing route
Binder / alloy considerations	Cobalt binder most common; nickel or nickel-chromium binders occur. Binder type and fraction vary by grade and lot; analysis available or agreed where applicable.
Common attachments	Steel shanks, holders, casings, braze alloy, clamps and screws
Common contamination considerations	High speed steel and tool steel, ceramic and cermet inserts, grinding debris, plastics and packaging
Moisture considerations	Free cutting fluid, oil and water should be drained before packing; residual moisture assessed at inspection
Evaluation method	Visual inspection and physical sorting, supported by XRF screening where agreed; contractual figures require agreed sampling and analysis

Typical packaging	Steel drums or reinforced bins, palletised and strapped, weights kept within safe handling limits
Lot segregation	Clean solid carbide, steel-attached items and fines packed and labelled separately where practical
Inspection availability	Third-party inspection can be arranged at the loading location; scope and appointment to be agreed in the contract
Documentation	Commercial invoice, packing list and transport documents; waste-shipment and customs documentation as required by the specific trade lane

Evaluation considerations

- Ratio of clean solid carbide to attached non-carbide material such as steel shanks and casings
- Presence and quantity of high speed steel, tool steel or other non-carbide tooling in the drum
- Whether the lot can be economically sorted into cutting-tool and mining/wear streams
- Piece size distribution — very fine broken material behaves differently in processing than solid pieces
- Consistency between the photographs or description offered and the material actually presented
- Whether the binder system is cobalt-based or nickel-based, where that is known or determinable

Common contamination and deduction factors

- Steel shanks, holders, casings and brazed bodies still attached to carbide tips
- High speed steel and tool steel tooling mixed into the carbide
- Loose steel swarf, bolts, clamps, shims and screws from insert holders
- Plastic insert boxes, packaging, cardboard, wood and rags
- Grinding wheel fragments, ceramic and cermet inserts, and abrasive dust
- Cutting fluid, oil and free moisture carried in the drum
- Occasional non-tungsten heavy items introduced during collection

Inspection and analysis

Analysis on a mixed hard lot serves two different purposes and the two should not be confused. Screening exists to sort — to separate carbide from high speed steel, to identify nickel-bound pieces, and to flag anomalies before packing. Contractual analysis exists to establish an agreed figure, and it requires a sampling protocol both parties have accepted in writing.

For mixed lots, representative sampling is harder than for single-origin streams precisely because the lot is heterogeneous. Sampling should span drums, depth within drums and size fractions. Elements that are usually of interest include tungsten, cobalt, nickel, iron and chromium, with iron indicating steel carry-over and chromium and nickel pointing to steel or nickel-bound grades.

- Handheld XRF reads the surface of the piece it is pointed at. Coatings, braze alloy, oxide layers, cutting-fluid residue and plating can bias a surface reading.
- A reading on one piece is not a lot average. Heterogeneous lots require representative sampling across drums, layers and size fractions before any figure is treated as commercially meaningful.
- XRF is an elemental technique. It does not measure grain size, binder distribution, sintering condition, carbon balance or the mechanical history of a component.
- Screening results are an indication used to sort and to price-discuss. Contractual figures require the sampling and analysis method the parties have agreed in writing.

Packaging and lot segregation

- Steel drums or reinforced bins, palletised, strapped and clearly labelled by fraction
- Package weights kept within safe manual and mechanical handling limits
- Load distributed across the container floor rather than concentrated in one area

- Lot identity, gross and net weight, and fraction description marked on each package
- Photographic record of packed fractions retained for the lot file

Customs classification

Customs classification for tungsten-bearing secondary material depends on the actual composition and physical form of the goods, on whether the material is solid scrap, powder, sludge or residue, on the destination country, and on how the competent authority in that jurisdiction interprets the material description.

A mixed hard carbide lot can present additional classification complexity where non-carbide items — steel shanks, holders or other tooling — travel with the carbide, because the description of the goods must reflect what is actually shipped.

Nautica does not assign a definitive tariff code in advance for this stream. Buyers and importers should confirm the applicable classification, duty treatment and any import licensing or waste-shipment obligation with their own customs broker or the competent customs authority for the destination before contracting.

Documentation

Commercial invoice, packing list, transport documents and any customs, waste-shipment or licensing documentation required for the specific trade lane. Documentary requirements are confirmed per shipment and per destination.

Commercial and specification disclaimer

This document describes typical characteristics of a secondary raw material stream. Scrap of this type is heterogeneous by nature: composition, alloy or binder content, contamination and recoverable content vary between lots and within a single lot.

Nothing on this page constitutes a guaranteed specification, a warranty of composition, a declaration of purity or an offer capable of acceptance. Guaranteed specifications, tolerances, sampling protocol, analysis method, acceptance criteria, deduction mechanics and rejection rights exist only where they are written into the signed sales contract between buyer and seller for a specific lot.

Where a buyer requires assured values, those values must be defined contractually and verified by an agreed inspection or analysis procedure before shipment.

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