

## Tungsten Carbide Soft Scrap Specification — Powder, Grinding Sludge and Swarf

Material category: Tungsten carbide soft scrap (powder, sludge, swarf)

Tungsten carbide soft scrap: unsintered powder, grinding sludge, swarf and fine tungsten-bearing residues arising from carbide manufacturing, grinding and finishing operations.

Soft scrap is tungsten-bearing material in fine or unsintered form: powder, grinding sludge, swarf and residues. It is not a lesser version of hard scrap — it is a different physical material with different handling, moisture, sampling and shipment requirements, and it must never be described interchangeably with solid carbide.

### Material description

In the hardmetal trade, hard scrap means sintered solid carbide components and soft scrap means everything tungsten-bearing that is not sintered solid: pressed but unsintered green compacts, spray-dried and ready-to-press powder, reclaim powder, grinding sludge, swarf and the fine residues collected from finishing operations. The distinction is fundamental. Hard scrap is a solid, dry, dense, stable article; soft scrap is a fine or semi-liquid material whose tungsten is dispersed through a matrix of coolant, abrasive and metallic fines.

Soft scrap is generated mainly inside the hardmetal industry itself and in the shops that grind it. Carbide manufacturers produce powder and green-state rejects; tool grinding and regrinding operations produce sludge and swarf as the wheel removes carbide from the workpiece; finishing and polishing produce fines. Because grinding removes material from both the carbide and the wheel, sludge always contains abrasive as well as carbide.

### Typical material forms

- Ready-to-press and spray-dried carbide powder, including off-specification and expired batches
- Green-state pressed compacts and unsintered rejects, which crumble rather than chip
- Grinding sludge from carbide tool grinding, typically a wet paste of carbide fines, abrasive and coolant
- Filter-pressed or briquetted sludge cake produced by coolant filtration systems
- Dry grinding swarf and collected fines from extraction systems
- Polishing and lapping residues containing tungsten-bearing fines

### Specification table (typical characteristics)

|                                            |                                                                                                                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Material category</b>                   | Tungsten carbide soft scrap — unsintered powder, sludge, swarf and fines                                                                                          |
| <b>Material form</b>                       | Ready-to-press and reclaim powder, green compacts, grinding sludge, filter cake, dry swarf, polishing residue                                                     |
| <b>Primary recoverable material</b>        | Tungsten-bearing fines dispersed in a coolant and abrasive matrix; recovery typically via chemical or hydrometallurgical routes                                   |
| <b>Binder / alloy considerations</b>       | Cobalt and other binder fines are present in ground residues; concentration varies by generating operation and lot, analysis available or agreed where applicable |
| <b>Common attachments</b>                  | Not applicable — soft scrap has no attached components; the matrix itself is the issue                                                                            |
| <b>Common contamination considerations</b> | Grinding wheel abrasive, steel and HSS fines from mixed grinding, filter media, floor debris, free oil                                                            |
| <b>Moisture considerations</b>             | Critical. Free water and coolant can form a substantial share of as-received weight; dry basis versus as-received basis must be agreed contractually              |
| <b>Evaluation method</b>                   | Representative sampling with drying and settling checks, supported by laboratory analysis where agreed; visual assessment alone is not sufficient                 |

|                                |                                                                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Typical packaging</b>       | Sealed steel or lined drums; sealed lined bulk bags for dry material only; filled by weight, not volume                                         |
| <b>Lot segregation</b>         | Powder, dry swarf, wet sludge and pressed cake kept as separate labelled fractions                                                              |
| <b>Inspection availability</b> | Inspection and sampling can be arranged at the loading location; sampling protocol and analysis method to be agreed in the contract             |
| <b>Documentation</b>           | Commercial invoice, packing list stating physical state per fraction, transport documents and lane-specific customs or waste-shipment paperwork |

## Evaluation considerations

- Moisture and free liquid content, and whether the material has been dried, filtered or pressed
- Abrasive load from grinding wheel breakdown carried in the sludge
- Whether the generating shop grinds carbide exclusively or carbide together with steels
- Oil versus water-based coolant, and free oil present in the drums
- Physical state — free-flowing powder, damp swarf, paste, or pressed cake
- Consistency across drums, and whether the lot is one campaign or an accumulation over time
- Availability of a representative sample taken across the lot rather than from one drum

## Common contamination and deduction factors

- Free water and coolant, which can form a substantial share of as-received weight
- Grinding wheel abrasive and bond material distributed through the sludge
- Steel and high speed steel fines from mixed grinding operations
- Free oil, grease and tramp hydraulic oil in the collection system
- Filter paper, filter media, cloth and bag fragments carried into the drums
- Floor sweepings, dust and general debris where collection is not controlled
- Container corrosion products where wet material has been stored in steel drums for long periods

## Inspection and analysis

Soft scrap is the stream where handheld surface screening is least informative and formal sampling most important. XRF pointed at a heap of wet sludge reads the surface of whatever is presented at that spot — an abrasive-rich crust, a wet skin, or a locally concentrated pocket — and no such reading represents the drum, let alone the lot.

A workable approach is incremental sampling across drums and depths, combining increments into a composite, and determining moisture by drying before any elemental figure is discussed. Elements commonly of interest are tungsten and cobalt for the recoverable fraction, iron for steel fines from mixed grinding, and nickel and chromium where nickel-bound grades or alloy steels are involved.

Nautica does not operate its own laboratory. Where analysis is required, it is performed by a laboratory or inspection company the parties appoint and agree in the contract.

- Surface readings on wet or heterogeneous residues are not representative of the lot.
- Moisture must be determined separately; elemental results on as-received material are not comparable to dry-basis results.
- Abrasive and filter media dilute the sample and must be accounted for in interpretation.
- Composite sampling across drums and depths is required before any figure is treated as commercially meaningful.
- Contractual figures require the sampling and analysis method the parties have agreed in writing.

## Packaging and lot segregation

- Sealed steel drums with secure closures, or lined drums for wet material
- Sealed lined bulk bags only where the material is dry and the bag is rated for the density
- Drums filled to a weight that can be handled safely, well below volume capacity

- Powder, dry swarf, wet sludge and pressed cake kept as separate labelled fractions
- Free liquid decanted before packing where the collection system allows
- Each package labelled with lot reference, fraction, physical state and net weight

## **Customs classification**

Powders, sludges and residues are frequently described and controlled differently from solid metal scrap.

Classification depends on the actual composition, the physical form as shipped, the moisture and matrix content, the destination country and the interpretation of the competent customs authority there.

Some destinations apply additional import controls, prior notification requirements or restrictions to fine and wet residues that do not apply to solid scrap of the same metal family.

Nautica does not assign a definitive tariff code for soft scrap in advance. Importers must confirm the applicable classification and any import permit, notification or waste-shipment obligation with their customs broker or the competent authority 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.

This document states typical material characteristics only. It is not a guaranteed specification, a warranty of composition, a certificate of analysis or an offer capable of acceptance.