# Mining QC Strategy Checklist XRF vs. XRD

Quick Reference for Lab & Field Use

| Purpose of the analysis | XRF | XRD |
|---|---|---|
| Elemental anomalies (e.g. presence of Co) | ✓ | |
| Elemental composition (e.g. % Ni, ppm REE) | ✓ | |
| Mineral identification (e.g. spodumene or petalite) | | ✓ |
| Mineralogical composition (e.g. % chalcopyrite) | | ✓ |
| Trace element detection | ✓ | |
| Detect oxidation stages (e.g. Fe2+ vs Fe3+) | | ✓ |
| Distinguish crystalline vs amorphous | | ✓ |
| Clay identification (kaolinite vs illite) | | ✓ |

| Sample requirements | XRF | XRD |
|---|---|---|
| Loose powder (dry & fine, < 75 µm) | ✓ | ✓ |
| Pressed pellets | ✓ | ✓ |
| Fusede beads | ✓ | |
| Liquids | ✓ | |
| Sample homogeneity critical | ✓ | ✓ |

| Operating context | XRF | XRD |
|---|---|---|
| In-field (portable) | ✓ | |
| Laboratory | ✓ | ✓ |
| Process (real-time) | ✓ | |
| Automation | ✓ | ✓ |

| Stage in the mining process | XRF | XRD |
|---|---|---|
| Exploration phase | ✓✓✓ | ✓✓ |
| Extraction operation | ✓ | |
| Process control (e.g. blending, geometallurgy) | ✓✓✓ | ✓✓✓ |
| Research | ✓ | ✓✓✓ |
| Environmental screening | ✓✓✓ | ✓ |

## Tips and Pitfalls

!! Calibrate the instrument regularly using CRMs similar in composition to your ore.

!! XRD quantifies amorphous content but cannot identify its composition.

✓ Use XRF and XRD together for optimal geometallurgical or process analysis.