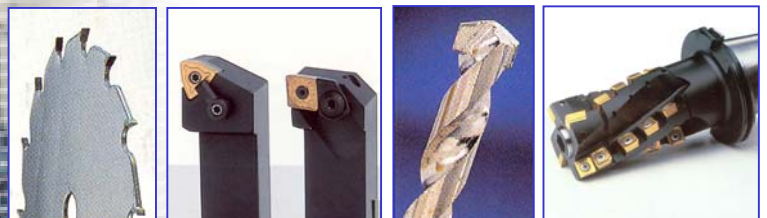
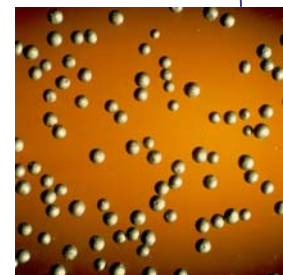
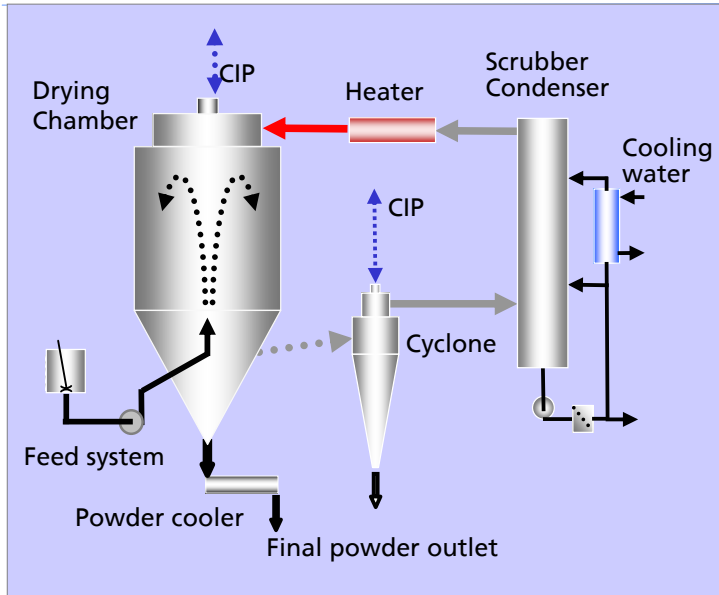


Closed cycle
SPRAY DRYERS

Press ready
hard metal
powders





HC Closed Cycle plants (HC-CC)

Plant sizes for industrial production of carbides being in compliance with current EU directives

All closed cycle spray dryers for production of carbides (hard metal powders) are pre-erected and pressure tested before shipment.

Capacities

60, 120, 160, 300, 600 kg/h product

Test facilities available for open and closed cycle operations.

Spray Drying of Carbides for Hard Metal Powders

The application of closed cycle spray dryers in hard metal powder manufacture has been an area of unique NIRO development and, today, the majority of the world's cemented carbides are processed resulting from this development. For both traditional and advanced high-tec ceramics, Niro has supplied a number of spray dryers in open and closed cycle concept. The open concept is used for water based materials. A reference list of over 115 drying installations for hard metal powders emphasizes the company's capability.

Carbide powders for cutting or mining tools are mainly produced as ready press powder in one single operation, generally based on a suspension in an organic solvent such as ethanol, acetone, or hexane. This calls for closed cycle spray drying in an inert nitrogen atmosphere, to prevent oxidation degradation of powder, for safety, environmental protection, and solvent recovery reasons. The flow diagram shows the plant concept with nozzle atomization, and is selected to optimize production of free flowing press powder with a narrow particle size distribution. Solvent recovery is performed in a combined scrubber condenser unit.

For a number of carbides and mixtures containing other metals, where oxidation degradation needs to be controlled / avoided, the feed material is produced in a milling process as a suspension in organic solvent. This cannot be dried in a

conventional open cycle system, which would involve fire and explosion risks and emission of all process air to the environment.

Due to safety and unwanted oxidation effects, formulations cannot be processed in conventional air drying systems. The nature of closed-cycle operation requires more complex instrumentation and cleaning-in-place systems.



A PC/ PLC based operator system with flat screen monitor, recipe, colour pop-up menus are used to control and monitor the plant operation, ensuring the constant operating conditions necessary to obtain a reproducible free flowing pressbody of

high uniform quality in one single process. An automatic cleaning-in-place system based upon PLC control gives the necessary full operator safety during cleaning, which is thoroughly carried out in reduced time periods.

Industrial dryers are normally small in size and are supplied as package units which have been pre-erected and tested. This is a NIRO Quality Assurance requirement to ensure that dryers are both gas- and powder tight.



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