

# TECHNICAL BULLETIN



**KAYSER**  
TECHNOLOGY

## ACE-MODEL M100 PERFORMANCE CAPABILITIES

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### SUMMARY

ACE-Model M100 deposits metals onto spray dried powders. The “M” is for “Metallation” and the 100 is for the nominal capacity in grams of the catalyst charged to the M100 reactor. The current version includes a triple feed system whereby metals can be injected into the reactor. KTI’s Technical Center has one Model M100 unit which can metallate about 1000 samples per year.

M100 can independently inject metals like Nickel and Vanadium from separate feed systems. Combinations of metals can also be used. The M100 machine executes detailed multi-injection procedures with the utmost control. The catalyst balance on the M100 is very tight at 99.7 to 100% recovery at 2-sigma. Metals balances depend on the accuracy and precision of the method of metals measurement (XRF or ICP), but are usually  $\pm 3\%$  of 100%. The feed injection systems are precise to  $\pm 0.0002$  grams out of 1.0000 gram (99.98-100.02%).

### CAPABILITIES

#### OIL-BASED CRACK-ON TECHNIQUE:

The default M100 method for depositing metals on FCC and any spray dried catalysts is by cracking organometallic compounds dissolved in a base-oil directly onto the catalyst at nominally 550-600°C. The crack-on technique locates the metals primarily on the outer-shell of the catalyst particles. This technique best emulates commercial deposition mechanisms at the bottom of commercial riser reactors. Organometallics can be expensive, but the scale of M100 is small enough that consumable material costs are usually not prohibitive.

#### AQUEOUS SALTS TECHNIQUE:

Compounds can also be dosed onto spray dried catalyst using a form of flash deposition of aqueous salts. The temperature for this technique is very close to the boiling point of water. Aqueous salts are generally less expensive and straightforward to work with. Good control, however, is still required to make this technique work. KTI will use aqueous salts if the oil-based approach is for some reason not readily possible or if a certain aqueous salt is of direct interest.