

Exposure Assessment Protocol for TiO_2

- **Make an initial determination whether exposure may be to fine or ultrafine TiO_2 :**
 - Manufacturers specifications of particle size
 - Analysis of bulk powder for primary particle size
 - Ascertain whether handling or processing of TiO_2 might alter the primary particle size

Exposure Assessment Protocol for TiO_2

- **Mass-based airborne concentration measurement with NIOSH Method 0600 using a standard 10-mm nylon cyclone or equivalent particle size-selective sampler**
- Surrogate for Measuring Particle Surface Area
- Can be Routinely Used for Determining RELs when:
 - the TiO_2 airborne particle size distribution is known
 - the particle size distribution remains relatively constant

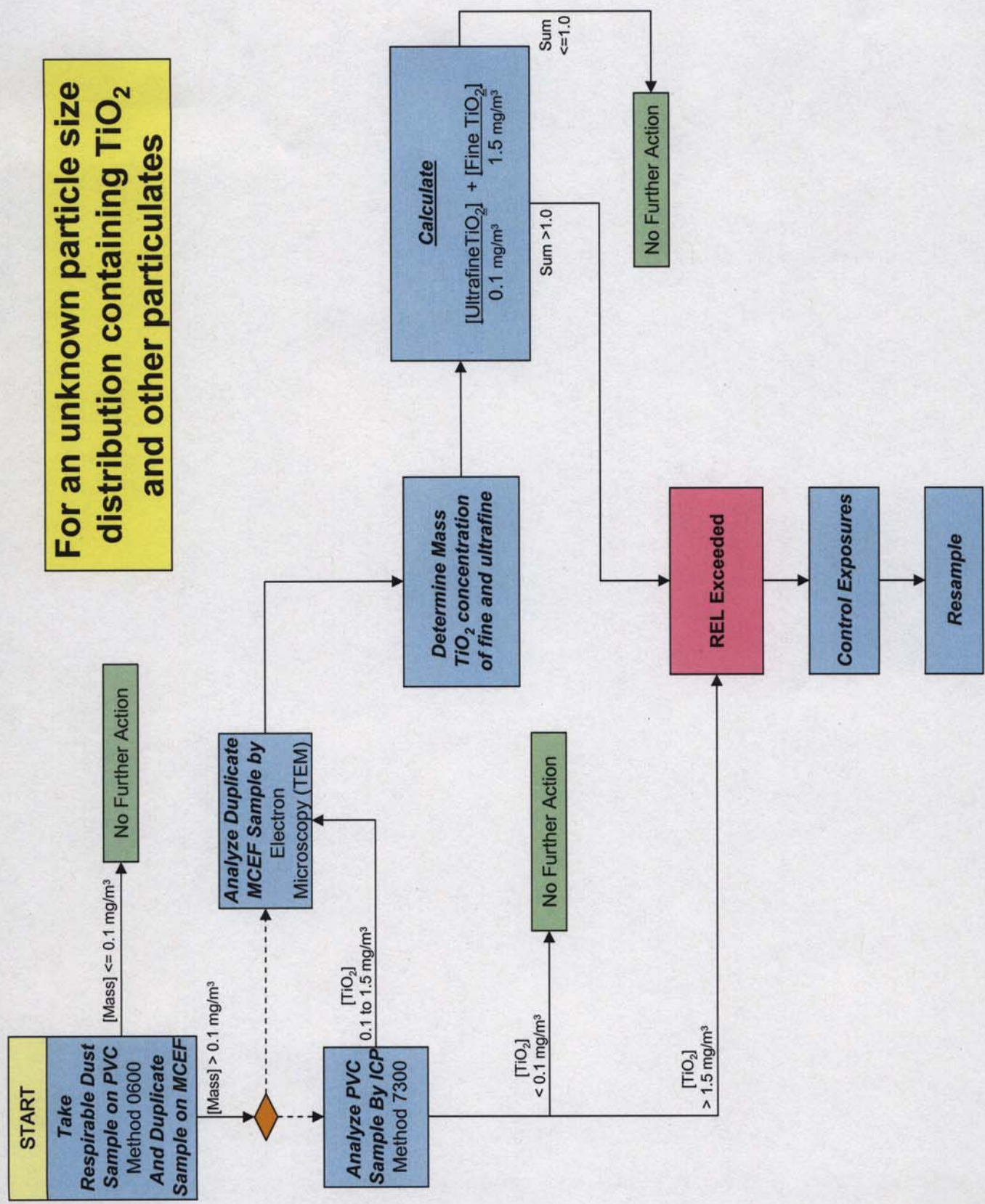
Exposure Assessment Protocol for TiO_2

- Initial exposure assessment should include simultaneous collection of respirable dust samples (Method 0600) using both PVC and mixed cellulose ester (MCE) filters

1. Concentration $< 0.1 \text{ mg/m}^3$ → no action required
2. Concentration $> 0.1 \text{ mg/m}^3$ then:

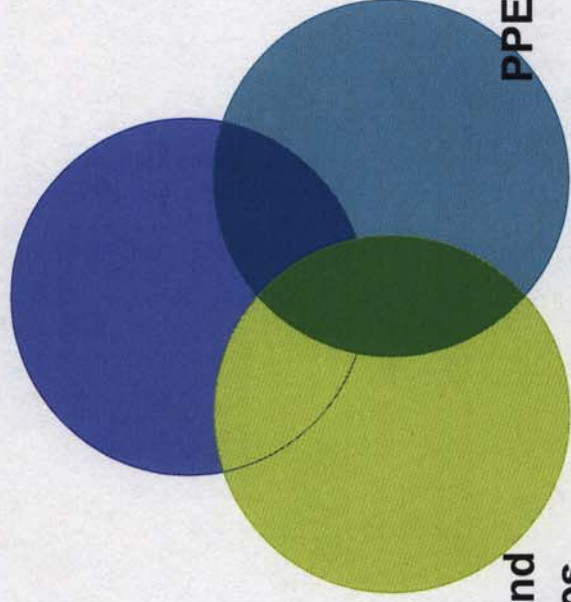
1. Perform electron microscopy and EDXA on MCE filters for particle identification and size to determine percentage of fine and ultrafine TiO_2
2. Percent of each TiO_2 size fraction used to calculate mass exposure concentration
3. Analyze PVC samples by ICP [Method 7300] for titanium (hot H_2SO_4 or HF required for oxide determination)

For an unknown particle size distribution containing TiO₂ and other particulates



Control of Workplace Exposures to TiO₂

Engineering Controls



Worker Education and
Good Work Practices

PPE including Respirators
when Required

Control of Workplace Exposures to TiO₂

- **Primary Means of Controlling Exposures:**
 - Engineering Controls that include process modifications and exhaust ventilation to control exposures below RELs
 - Worker education and training that incorporates instruction on good work practices

Respirator use required when airborne exposures can not be maintained below RELs

--- Use NIOSH Respirator Selection Logic for respirator determination [NIOSH website: www.cdc.gov/niosh]