**Goal:**
Demonstrate the capability to machine 45° helical grooves on a 1.4 meter drum with no visible seam between the first and last groove.

**Process:**
XZC diamond turning on a DRL1600 with a 90° included angle tool mounted at a 45° angle. Tight temperature control is used over the long cutting time to insure that there is no visible seam between the first and last groove.

**Part Details:**
- **Material:** Copper-plated steel drum
- **Length:** 1400 mm
- **Diameter:** 270 mm
- **Weight:** 350 kg
- **Optical zones:** 1100 mm

**Machine Details:**
- **Spindle type:** oil bearing
- **Slide type:** oil bearing, water cooled, linear motor driven
- **Temperature control:** Praecis® temperature control

**Process Details:**
- **Tool angle:** 90° included angle
- **Spindle speed:** 12 rpm
- **Z axis feed rate:** 10 m/min
- **Pitch:** 50 µm
- **Depth:** 25 µm, cut in one pass
- **Machine time:** ~ 50 hrs

**Results:**
- **Pitch variability:** < 0.5 µm
- **No visible seam between first and last groove**