SCOPE:

These guidelines are to assist the analyst with the analysis of gold and gold alloys used in the jewellery manufacturing industry by making use of a surface XRF scanner. The plating of jewellery is taken into consideration during the preparation of a piece before analysis.

NOTES:

1. Consult the User Guide for the specific instrument to be used.
2. Ensure that the analyst is familiar with proper operation and radiation safety of the equipment.

EQUIPMENT PREPARATION:

1. Turn the analyser on. Wait a few minutes (5 to 10 minutes) for the instrument electronics to stabilise.
2. Verify that all settings (e.g. date etc.) are correct and that the equipment is connected to all necessary devices (e.g. computer, monitor, printer, etc.).
3. Ensure that the calibration of the instrument is appropriate and still valid.
4. A system check can be performed. When a “System OK” message is displayed continue to step 5, if not and an error message is displayed report it to a senior person or to the supplier of the XRF scanner for possible service and re-calibration of the XRF unit.
5. Do a Quality Control check by reading certified standards or reference materials.
6. If the Quality Controls are within the acceptable limits, continue with the analysis as from step 8.
7. If the Quality Controls are not within the acceptable limits report it to a senior person or to the supplier of the XRF scanner for possible service and re-calibration of the XRF unit. Do not continue with the analysis.
8. Continue with the analysis as outlined in the next section if the Quality Controls are within limits.
**ANALYSIS:**

**Plating Detection:**

During analysis, the following is an indication of possible plating:

1. Detection of nickel (Ni)
2. Variance of gold of more than 1 to 2%
3. Look for identifying marks to indicate Au plating
4. Karat ratings that are not one of standard percentages (e.g. 9, 10, 14, 18, 22, 24 etc.)
5. Karat ratings of less than 9 karat.
6. A strong magnet can identify magnetic substrate under the gold plating.
7. If still unsure, a deep file or grind can be performed, and the spot analysed. A reduced Au content indicates possible plating.
8. The presence of Rhodium (Rh) is an indication of plating and should be removed before the gold concentration is determined:
   8.1 Sand and polish an area of the item to remove the Rh.
   8.2 Scan the polished area. If Rh is still present, repeat step 7. Continue to polish the area until no Rh is detected. The surface is prepared for proper gold analysis when all Rh is removed.

**Analysis of the item:**

1. Place the jewellery piece over the sensor.
2. Select an analysis time suitable for the level of accuracy required i.e. longer scan time for lower grade Au, or longer scan time for small items.
3. If necessary, the item can be scanned in different areas.