

Tool Balancer Weight Selection for Assembly

1.0 Objective & Quality Standard

The objective of this procedure is to ensure that the tool balancer is correctly weighted to counterbalance the tool weight within ± 0.2 kg of the tool's actual weight, allowing the operator to handle the tool with minimal effort and zero drift. Proper weight selection prevents tool sag, reduces operator fatigue, and protects the tool from impact damage when not in use.

The acceptable tolerance for balancer weight selection is ± 0.2 kg from the tool's measured weight. If the tool weight is unknown, it must be measured using a calibrated scale before proceeding.

2.0 Required Tools & Gauges

- Digital scale (capacity 0–50 kg, resolution 0.01 kg) – calibrated within last 12 months
- Tool balancer with adjustable weight setting (e.g., 1–5 kg range)
- Set of calibrated weight discs (0.5 kg, 1 kg, 2 kg increments)
- Torque wrench (for securing balancer mounting bolts, if applicable)
- Safety lanyard or tether for tool attachment
- Calibration sticker or log for scale verification

3.0 Safety & Material Handling

- Wear approved safety glasses and steel-toed boots when handling tools and balancers.
- Ensure the balancer is securely mounted to a rated overhead beam or trolley before attaching any tool.
- Use two hands when lifting tools heavier than 5 kg to prevent back strain.
- Do not exceed the maximum rated capacity of the balancer as indicated on the manufacturer's label.
- Keep hands clear of moving parts during adjustment and testing.

4.0 Step-by-Step Procedure

1. Verify that the tool balancer is securely mounted to the overhead structure and that the mounting bolts are torqued to the manufacturer's specification (typically 20–30 Nm).
2. Place the tool on the digital scale and record its weight to the nearest 0.01 kg. If the tool includes attachments (e.g., hose, quick-connect), include them in the weighing.
3. Refer to the balancer's weight adjustment chart or dial. Set the balancer to the weight closest to the tool's measured weight, rounding to the nearest 0.5 kg increment.
4. Attach the tool to the balancer using the provided safety lanyard or tether. Ensure the connection is secure and the tool hangs freely without obstruction.
5. Gently pull the tool down to its full working extension (approximately 1.5 m below the balancer) and release it. Observe the tool's return behavior: it should retract smoothly without bouncing or sagging.

6. If the tool sags or does not retract fully, increase the balancer weight by 0.5 kg and repeat step 5. If the tool retracts too quickly or bounces, decrease the weight by 0.5 kg.
7. Once the tool returns smoothly, perform a drift test: position the tool at waist height and release it. The tool should remain stationary within a 50 mm vertical zone for 5 seconds. If it drifts up or down, adjust the weight by ± 0.2 kg increments until drift is eliminated.
8. Record the final balancer weight setting and the tool weight on the ShopDocs QA checklist. Attach a label to the balancer indicating the tool name and weight setting for future reference.

5.0 Verification & Defect Reporting

1. After final adjustment, verify that the tool weight is within ± 0.2 kg of the balancer setting. If the difference exceeds 0.2 kg, re-weigh the tool and re-adjust the balancer.
2. If the balancer cannot be adjusted to achieve smooth operation within the tolerance, red-tag the balancer and remove it from service. Report the defect to the maintenance team via ShopDocs with a description of the issue (e.g., worn spring, damaged mechanism).
3. If the tool weight changes due to added attachments or wear, repeat the entire procedure before returning the tool to production.
4. Log all out-of-tolerance findings and adjustments in the ShopDocs QA module for continuous improvement tracking and root cause analysis.

Regulatory Disclaimer: This document is a generic quality assurance template. The end-user assumes all liability for validating all dimensional tolerances, testing procedures, and engineering specifications against actual production requirements before deployment.