1. Reasons for selecting the theme (within 100 words)

Bending is the core process of sheet-metal forming. This work builds a complex 3-dimensional framework with 42 bends, demonstrating the precision forming of metal sheets from flat planes to three-dimensional shapes. Electroplated blue-zinc carbon steel delivers industrial texture and corrosion resistance, integrating practicality and artistic craftsmanship.

2. Reasons for material selection (within 100 words)

SPCC features high strength, good ductility and excellent bending performance for complex multi-bend structural parts. Surface electroplated blue-zinc forms a passivation protective layer with uniform, fine finish. It balances wear resistance and decorative appearance, ensuring stable precision and attractive visual effect for finished pieces.

3. Key featured parts / positions (within 100 words)

The sequencing of 42 bends and clearance-avoidance design represent the craftsmanship. Bending sequence governs cumulative errors and forming interference. Reserved clearances at corners and holes enable smooth bending and stable dimensional chains. Concentricity of upper-and-lower holes showcases ultra-precision blanking and bending capability.

4. Most challenging parts (within 100 words)

4.1 Difficult sequencing for 42 bends: Machining shall expand outward from the reference. Improper sequence causes cumulative errors and closed-bend tool interference; tool layout for multi-bend components is demanding.
4.2 Challenging clearance-avoidance design: Pre-fabricated relief holes and slots prevent tearing and interference. Position, dimension and tolerance of relief features require precise control.

5. Key takeaways from drawing design to actual machining (within 100 words)

Clearance-avoidance, bend sequence and reference surfaces shall be planned in drawings, with springback allowance reserved. Machining strictly controls positioning accuracy and bending angles to stabilize cumulative dimensions of 42 bends, avoid sequence-caused interference and guarantee sound structure and smooth assembly.