Product Specification: Manhole Access Covers for High Volume Traffic Applications

1. Overview

This specification outlines the requirements for manhole access covers designed to be installed in high volume or heavy traffic areas, specifically in wheel tracks. These covers will provide secure, durable, and functional access to underground utilities while ensuring safety and performance under demanding conditions.

2. General Requirements

- **Application**: Designed for use in areas with high traffic volumes, particularly in roadways or locations where vehicle wheel tracks are common. Suitable for both industrial and commercial applications with heavy vehicular load.
- **Compliance Standards**: The product shall conform to the following standards:
    - **AS 3996:2019** – Australian Standard for Access Covers and Grates, ensuring compliance with load-bearing classifications and safety measures.
    - **ISO 9001** – Quality Management System.

3. Material Specifications

- **Cover and Frame Material**: The manhole cover, and frame shall be made from high-strength **ductile iron** (minimum Grade 500-7), known for its durability, impact resistance, and load-bearing capability.
- **Corrosion Protection**: The cover and frame should be coated with a corrosion-resistant material such as bitumen or an epoxy coating to protect against environmental elements, including water, chemicals, and UV exposure.

4. Dimensions

- **Clear Opening**: The frame shall have a clear opening with a diameter of **600mm** to accommodate utility access.
- **Frame Dimensions**: Frame dimensions will be compatible with the 600mm clear opening, ensuring secure fitment and proper seating of the cover.

5. Load-Bearing Capacity

- **Load Class**: The access cover shall meet the **AS 3996:2019 Class D** load requirement, capable of supporting a minimum of **240kN** (kilonewtons) of load. **Class E 400kN** is preferred for areas experiencing heavier traffic or more demanding conditions.
- **Performance under Load**: The cover must remain securely in place even under dynamic load conditions, including heavy vehicular impact or rolling loads.

6. Cover Design Features

- **Hinged Design**: The cover shall be **hinged** to the frame to allow easy access. The hinge mechanism should allow smooth operation while maintaining structural integrity under heavy loads.
- **Secured Cover**: The cover shall be **secured within the frame** to prevent accidental release. This can be achieved using a **torsion bar locking system** that latches under the frame to ensure the cover remains closed and cannot be dislodged inadvertently.
- **Self-locking Mechanism**: The manhole cover will feature a **self-locking system** utilizing torsion bars that automatically engage to latch the cover securely under the frame when it is closed.
- **Automatic Latching under Load**: The cover must **close and latch automatically under load**. The torsion bars and hinge design should allow the cover to latch securely without manual assistance, even when subjected to traffic-induced vibrations or forces.
- **Safe Locking Position**: The cover shall be designed to **lock into a safe, secure position** at **90 degrees** (perpendicular to the frame), providing safe, stable positioning when opened for maintenance.
- **Easy Removal**: The cover must be able to **be removed safely at a 90-degree angle**, allowing for easy access and maintenance without requiring bolts or additional fasteners.

7. Sealing and Odour Control

- **Fully Sealed Frame and Cover**: The frame and cover shall feature a high-performance **rubber or elastomeric gasket** around the edge to provide a **fully sealed environment**. This ensures the following:
    - **Prevents water ingress** into the manhole, protecting underground utilities from water damage.
    - **Prevents odours** from escaping, maintaining sanitary conditions and mitigating unpleasant smells in the surrounding area.

8. Installation and Maintenance

- **Bolt-Free Design**: The cover shall **not require bolts** to secure it to the frame, eliminating the need for additional fasteners that may become lost or degraded over time. The cover shall remain firmly in place through its self-locking mechanism and hinge system.
- **Hinge Mechanism for Easy Access**: The hinged design ensures that the cover can be easily lifted and swung open for maintenance without requiring significant physical effort, even under heavy traffic conditions.
- **Maintenance**: The design should allow for periodic inspection, cleaning, and maintenance with minimal tools or expertise, focusing on the gasket and torsion bar system to ensure proper function over time.

9. Safety Features

- **Non-Slip Surface**: The cover shall have a **textured or anti-slip surface** to provide traction under wet or icy conditions, preventing accidents for both vehicles and pedestrians.
- **Reflective Markings (optional)**: For enhanced visibility at night, reflective markings or surface coatings may be incorporated to alert traffic of the presence of the manhole cover.

10. Environmental Resistance

- **Temperature Range**: The cover and frame shall be designed to function effectively within a temperature range of **-40°C to 80°C** suitable for diverse climates and geographical regions.
- **Chemical and UV Resistance**: The cover and frame shall be resistant to typical road chemicals (such as oils, salts, and fuels) and UV degradation, ensuring long-term service life even in harsh environmental conditions.

11. Testing and Quality Assurance

- **Load Testing**: The cover must undergo rigorous testing to ensure it meets the minimum load-bearing capacity as specified in AS 3996:2019, with a focus on both static and dynamic load conditions.
- **Dimensional Inspection**: Each cover shall undergo dimensional inspections to ensure compatibility with the standard manhole frame and proper fitment.

This product specification ensures that the manhole cover is designed for optimal performance in high-traffic and heavy-load environments while maintaining safety, reliability, and ease of use.