



The best investment there is for your subterranean structures.

The nature of the problem:

The numerous breakings caused in public subterranean structures (chambers of gates, electric rooms, glances, sewer, street catch basins) increases maintenance cost for most cities.

Indeed, the dense circulation and more particularly heavy vehicles (trucks and buses) produce fatal impacts on the manhole structure, damaging the near surfaces. Damage occurs principally to:

- The head
- Concrete ring
- The row of bricks

The life expectancy of subterranean structure is approximately 50 years under low traffic. However, some maintenance might be necessary after only 2 to 3 years in zone where traffic flow is high.

The solution:

Rubber rings «Flex O Ring™» is made of 100% recycled rubber. The «Flex O Ring™» is an effective and intelligent solution to reduce impacts on public subterranean structures at low cost. This is an environmentally friendly way to reduce your budget maintenance cost as low as possible.

The life expectancy:

Facts: City of Montreal started using our Flex-O-Ring adjustment ring approximately 15 years ago to lower their maintenance cost on busy street. As of today, all rings installed originally are still in place. Lately the City of Montreal decided to evaluate some subterranean structures where the Flex-O-Ring has been installed, the result were over their expectation. They didn't found any crack or deteriorate rings under any structures. They estimate life expectancy to be over 20 years where the Flex-O-Ring adjustment rings have been installed.

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Technical considerations:

Laboratory and site test shows that the Flex-O-Ring adjustment ring allow a better load and wheel impact distribution on street catch basin compare to standard catch basin build entirely with concrete.

Facts: Under head catch basin build with our Flex-O-Ring adjustment ring that are subject to static load of 7 900 kg (17 400 lbs) undergoes a collapse of 3 mm compare to standard catch basin . This is a temporary deformation. The Flex-O-Ring do is job, reason for this is quite simple, the ring absorbs the weight of the load and takes is initial shape after.

Furthermore, even when an impact bordering 10 000 kg is applied, the rubber ring is little sought or + - 10 % of its maximal resistance in compression.

Indeed, if we consider a load of 5 000 kg (11 000 lbs) of a back wheel of a vehicle and if we apply a factor of impact of 2, we obtaining a load of 10 000 kg (22 000 lbs) distributed over 2270 cm² (352 po 2). That is the surface of the rubber ring (the smallest BE 800). The constraint in compression is thus 4.4 kg / cm² (62.5 lbs / po2) with regards to the resistance in compression of the rubber, which during the manufacturing, varies between 42 kg / cm² (600 / po2) is 10,4 % of the capacity of the ring Flex O Ring [™].

Rubber ring Characteristics:

We're using only superior quality rubber that comes from shredded tires; otherwise no rubber ring would effectively weaken vehicle's impact on subterranean structures. The rings are made from a mixture of rubber and urethane, compressed and cook in a mould into the desire shape and size. Rubber hardness reach a minimum of 75 (Shore-A) with an acceptable gap of $\pm 5.6\%$. We're aware of our customer's expectation, that why we have implemented rigorous quality control to meet ISO-9000 quality standard.

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Available rings:

« **HIGHWAY RUBBER** » manufactures various models of rubber rings:

- With thickness variation between ½ " and 3 " by interval of ½ "
- Forms according to the frame: **round, square or rectangular**
- With a **flat or angled profile.**

Various ring models are available, allowing them to fit perfectly the subterranean structures in place.

Flat Rings

½ in.	12mm
1 in.	25 mm
1 ½ in.	37 mm
2 in.	50 mm
2 ½ in.	62 mm
3 in.	75 mm

Angle Rings

½ in. (12 mm)		1 in. (25 mm)		1 ½ in. (37 mm)	
Slope		Slope		Slope	
½ to 1 in.	12 to 25 mm	½ to 1 ½ in.	12 to 25 mm	½ to 2 in.	12 to 50 mm
1 to 1 ½ in.	25 to 27 mm	1 to 2 in.	25 to 50 mm	1 to 2 ½ in.	25 to 62 mm
1 ½ to 2 in.	37 to 50 mm	1 ½ to 2 ½ in.	37 to 50 mm	1 ½ to 3 in.	37 to 75 mm
2 to 2 ½ in.	50 to 62 mm	2 to 3 in.	50 to 75 mm		
2 ½ to 3 in.	62 to 75 mm				

Subterranean structure life expectancy

Street segment	Without rubber ring	With rubber ring
Busy	3 to 7 years	Minimum 20 years
Less Busy	8 to 12 years	Minimum 20 years

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Subterranean structure replacement cost

This may vary considering the numbers of parts that are to be replaced, the type of street pavement (concrete or asphalt) used, labour cost and more importantly the numerous inconvenience on traffic flow.

Saving to be done:

For most cities and agencies (DOT), our "Flex-O-Ring™" will increase the life expectancy of any subterranean structures, allowing low maintenance cost and recurrent saving.



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