



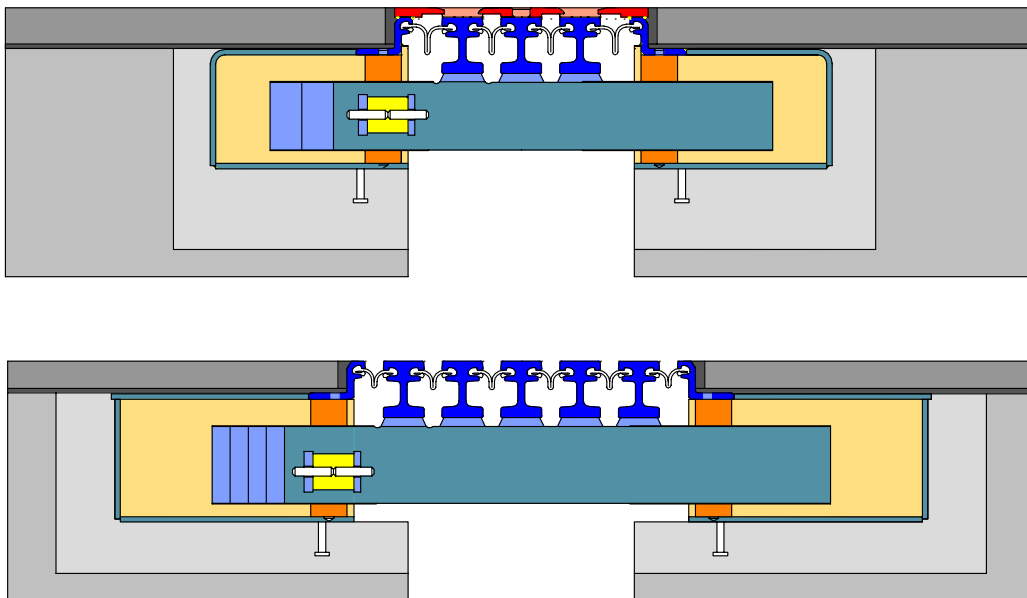
MAURER XL Expansion Joints

...the economic redesign of the girder grid joint

- entails noise protection at no or little extra cost
- less number of wearing parts
- smaller dimensions

MAURER Girder Grid Expansion Joints excel by their proven performance characteristics, such as water tightness, high safety in use, and a long service life. In order to also cater to the rising requirements of residents for protection from noise emissions, Maurer Söhne made comprehensive investigations into upgrading the present design of expansion joints, and developed rhombus shaped plates that are fixed on top of the lamellas of the expansion joints. By means of a continuous support of the passing tyres, noise emissions are considerably reduced.

In a second step, the geometry of the rhombus shaped steel plates was modified such that without impeding both riding comfort and noise protection, a maximum single gap opening of 100 mm could be reached, as compared to the country specific varying maximum single gap opening of 60 mm to 80 mm. So, a new expansion joint variation was created bearing the suffix XL, that entails a maximum of noise protection combined with a minimum of additional investment, as well as a simplified replaceability of the wearing parts, while maintaining the proven performance characteristics of MAURER girder grid expansion joints.



The upper graph depicts a MAURER Girder Grid Expansion Joint Type XL400 (4 seals make 4x100 = 400 mm of movement capacity in service stage).

The lower graph depicts a conventional D480 (6 seals make 6x65 = 390 mm movement capacity in service stage (according German specification))



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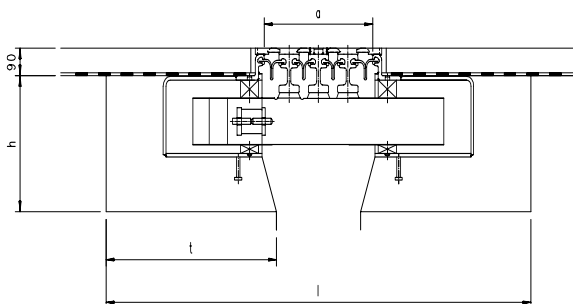
1. Movements and Main Dimensions

Conventional lamella joints are designed for a maximum single gap opening of 80 mm in service condition. In Germany, the permissible maximum gap opening is 70 mm, in Austria 65 mm. In both countries, an additional safety margin is introduced by means of a minimum gap opening of 5 mm to consider tolerances in design, production, and installation. By this consideration, in Germany the permissible movement capacity per single gap calculates to 65 mm. It could be proved that with the use of noise reducing rhombus shaped steel plates, maximum gap widths of up to 100 mm can be reached (without impeding load transfer and noise reducing effects).

N	type	v_x [mm]	a [mm]	h [mm]	t [mm]	l [mm]
2	XL 200	200	240	350	350	940
3	XL 300	300	380	370	430	1210
4	XL 400	400	520	390	520	1520
5	XL 500	500	660	390	620	1850
6	XL 600	600	800	410	720	2180

Movements and main dimensions of the XL type hold for a medium gap opening of 50 mm per gap and movement direction perpendicular to axis of joint

Also, skew movement directions are possible. The XL design was standardised for skew movements of $\alpha = 90^\circ \pm 30^\circ$.



2. General Approval acc. to German Specification TL/TP-FÜ

Girder grid expansion joints of type XL200 to XL400 enjoy the general approval of the German Federal Ministry of Transportation.

Further, Swivel Joint Expansion Joints of type XLS with a general approval in their basic design require an individual and additional approval for the complementary noise protection.

Further, a general approval is available of the Austrian Ministry of Economics for the XL type expansion joints.

3. Conditions of Use for Noise Reduction

With the General Circulation Paper (ARS) No. 15/2002, the German Federal Ministry of Transportation has defined the scope of application of expansion joints with reduced noise emission. Under certain design conditions, the innovative effect of the XL design can result in a cost neutrality, when comparing with conventional expansion joints. This relies on the XL design having an unlimited scope of application. Riding comfort is not impeded, and also traffic safety is maintained for two-wheelers like bicycles or motorbikes. Details for the magnitude of the noise reducing effect can be derived from the MAURER Product Information Brochure No. 24. It could be proved that at the hand of a given movement requirement, expansion joints featuring a bigger single gap width and a consequently smaller number of modules, the same noise reducing effect could be reached than using expansion joints with a conventional design.