RAIL.ONE
The way to go.

GETRAC® BALLASTLESS TRACK SYSTEM

ASPHALT IN ITS BEST FORM

We apply the precision and durability of asphalt layers for advanced, high-performance track systems.

THE PULSE OF THE TIMES

The essential requirements placed on mainline rail arteries for the 21st century are for fast, safe, and cost-effective tracks. In assessing the service life of these systems, operators are increasingly shifting their attention to total life-cycle costs. The most advanced technologies are essential in order to create track systems that are not only maintenance-friendly, but also highly available. RAIL.ONE responds to these challenges. With optimal solutions for track systems for railways and urban transit, and through its ongoing improvement of ballastless track systems, RAIL.ONE also effectively meets these challenges.

During the 1990s the technology of ballastless track systems underwent breath-taking development. Decades of stagnation in track technology gave way to numerous new rail track design solutions, all of which featured ballastless structures.

The use of asphalt as track-supporting layer soon came to play a key role in this development: logically, since the thermoplastic properties of asphalt assure satisfactory track geometry over the long term. The GETRAC® system fully exploits this benefit, especially effective as it is for railway tracks. GETRAC® implements high levels of productivity in track-system installation as well as very short overall construction times – which in turn have favourable effects on the duration of track possession and on track availability. As a result, the GETRAC® system offers an optimal cost-benefit ratio.

In 2004, the German Federal Bureau of Railways (EBA) provided official approvals, without speed limitation, for various GETRAC® model variations. This approval accordingly signifies official clearance of GETRAC® for high-speed track applications as well.


DB

GETRAC® A1

This railway track, based on asphalt, sets new standards in track construction as a result of its short construction time and immediate availability.

BALLASTLESS TRACK SYSTEM ON ASPHALT

GETRAC® A1 is a ballastless track system with direct support of the track panel on an asphalt supporting layer. This configuration guarantees safe and permanent positioning of the track. This mode of construction accordingly satisfies all requirements for application in railway and urban-transit situations. It can also be installed on an extremely cost-effective basis.

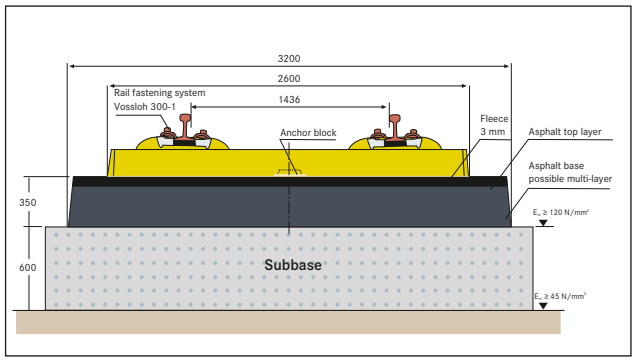
The GETRAC® A1 ballastless track system is characterised by highly elastic track support that retains its high levels of quality and safety throughout the entire life cycle. These benefits became possible by development of a new technology for anchoring prestressed-concrete sleepers to an asphalt layer. The prestressed-concrete sleepers are installed onto the asphalt supporting layer and are interlocked with the asphalt by means of anchor blocks. The anchor blocks are designed such that the longitudinal and lateral forces from the rails are transferred without difficulty into the asphalt supporting layer.

FAST AND SIMPLE INSTALLATION

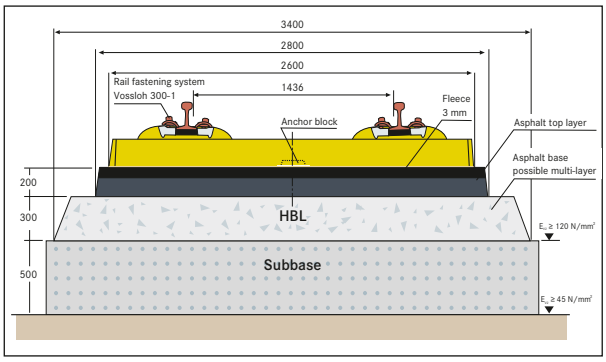
As a result of decades of experience gained in the emplacement of asphalt cover in traditional road construction, installation of asphalt layers with conventional road-building machinery is fully unproblematic for GETRAC® technology. Installation of the asphalt layers takes place in several layers by an automatically controlled, high-performance asphalt-laying machine guided by control cables. The bituminous supporting layer is installed onto a load-bearing ballast layer or hydraulically bonded layer. The cover layer, consisting of 0/11 asphaltic concrete, is produced with a high degree of precision. Its tolerance with respect to the required height is ± 2 mm over a measured line length of four meters.

Installation of the track panels is likewise possible with conventional track-construction equipment. GETRAC® also allows sleepers to be laid individually – or by means of prefabricated track sections, in order to optimize construction time. These options guarantee fast availability of the track system.

STRUCTURAL VARIANTS OF THE GETRAC® A1 BALLASTLESS TRACK SYSTEM

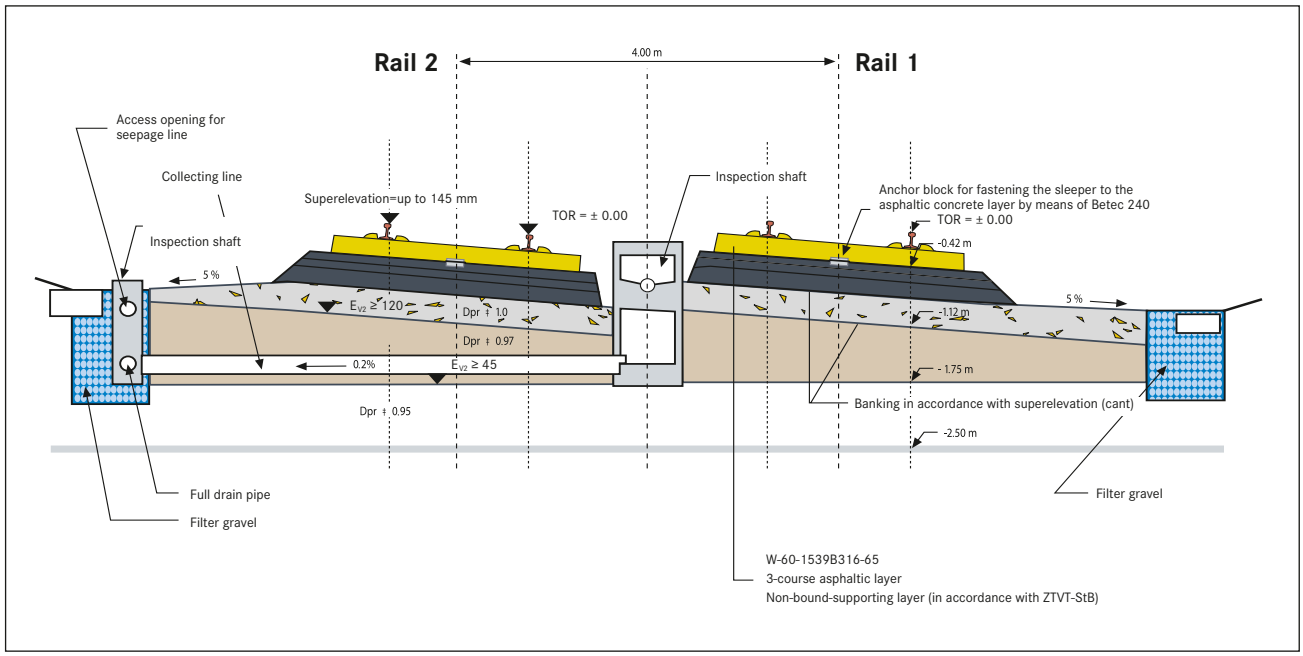


System cross-section without HBL ($E_{V2} \geq 120$ N/mm²)

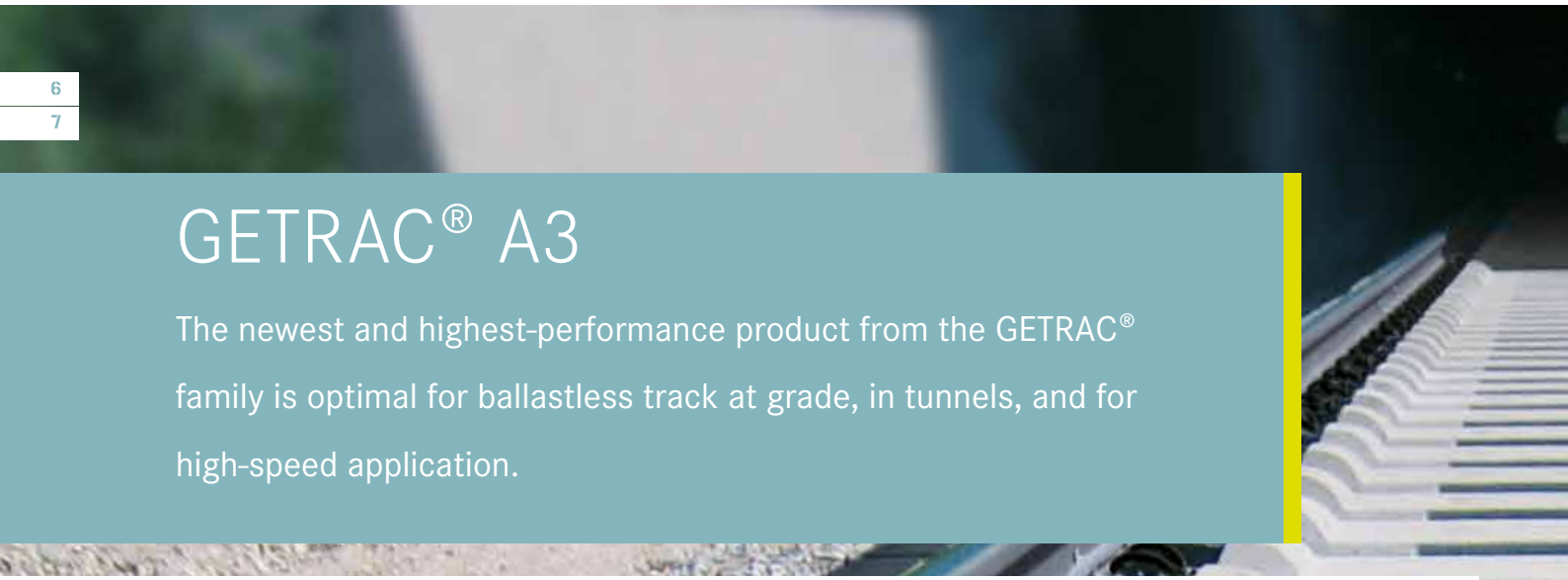


System cross-section with HBL ($E_{V2} \geq 120$ N/mm²)

INSTALLATION AT WESTKREUZ-RUHLEBEN IN BERLIN



Cross-section of the GETRAC® A1 ballastless track system



GETRAC® A3

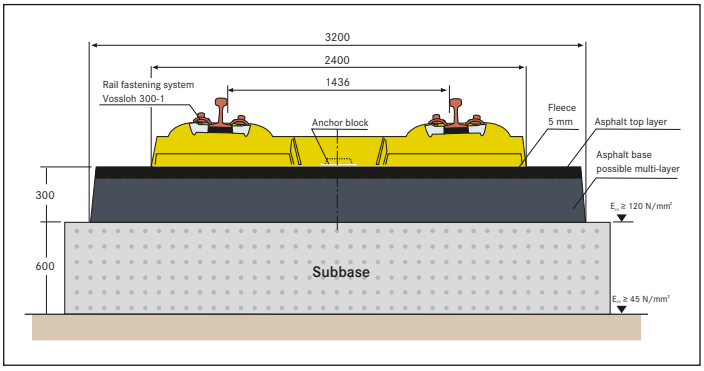
The newest and highest-performance product from the GETRAC® family is optimal for ballastless track at grade, in tunnels, and for high-speed application.

MOBILITY AND FLEXIBILITY

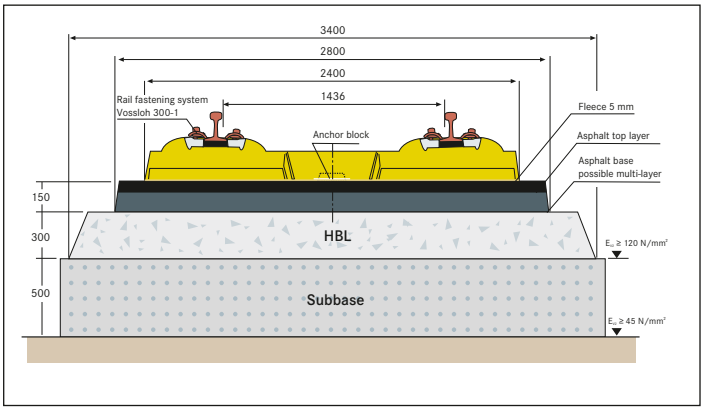
The GETRAC® A3 is a track system with direct support of wide concrete sleepers by a multi-layer asphalt base. The secure and permanent position of the track on the asphalt layer is assured by the bond of the individual asphalt layers to each other and by the connection of the pre-stressed concrete sleepers to the top asphalt layer. Every second or third wide concrete sleeper here is fixed at the asphalt layer with an anchor block. This configuration transfers the horizontal forces from the track panel into the asphalt and conducts them away there. The heavy weight of the wide concrete sleepers compensates for the uplifting forces acting on the track.

In addition to the very slight maintenance required, the GETRAC® A3 system is extraordinarily cost-effective owing to great productivity in laying the track and to the very short construction times.

STRUCTURAL VARIANTS OF THE GETRAC® A3 BALLASTLESS TRACK SYSTEM

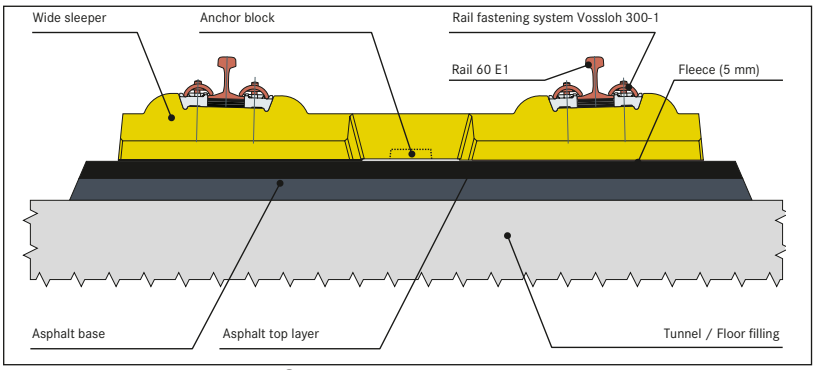


System cross-section without HBL ($E_{V2} \geq 120$ N/mm²)



System cross-section with HBL ($E_{V2} \geq 120$ N/mm²)

INSTALLATION IN A TUNNEL



Cross-section of the GETRAC® A3 ballastless track system

WIDE CONCRETE SLEEPER WITH PRE-ASSEMBLED ANCHOR BLOCK

The components are integrated into the sleeper at the factory and are delivered as a complete unit to the construction site.

TRACK INSTALLATION PROCEDURE

Short construction times and great precision – installation of the GETRAC® A3 is indeed impressive.

Simple installation is one of the major advantages of GETRAC® A3. At the same time, however, the required steps of work are carried out with great precision. As early as the surveying stage and during emplacement of the individual layers of the asphalt supporting layer, the utmost in exactness is essential, since the point supports later allow only slight corrections. First, a hydraulically bonded layer or the surface layer of civil constructions is installed, then the asphalt supporting layer. The asphalt course consists of at least two layers: the first is the actual supporting layer and the second – the cover layer – consists of asphaltic concrete. Both of these layers are laid by an asphalt finishing machine. Later, recesses for the anchor blocks are sawn out of the asphalt at exactly specified intervals. In the GETRAC® A3 system, these anchor blocks fasten every second or third concrete sleeper to the asphalt. In addition to this model, it is also possible – instead of using a hydraulically bonded layer – to provide thicker asphalt supporting courses and to install them directly onto the frost-protection layer.

Installation of the individual concrete sleepers takes place with conventional track-laying machines, in which case there are two transport options for delivery of the sleepers to the site. One possibility is by railway wagon, for which a gantry crane moves the sleepers to installation. The second option is by lorry, in which case a wheel-mounted front-end loader moves the sleepers the final distance.

A track liner performs horizontal adjustment of the track after laying. In order to achieve optimal track positioning for the later track, millimetre-exact positioning of each individual point support is essential. The adjusted track is temporarily fastened at each fifth or sixth sleeper to allow pouring of mortar for the anchor blocks; this prevents a change in position of the track panel. The following step is pouring of special mortar onto the anchor blocks, which permanently connects the block with the asphalt layer below. The final step is tightening of the rails to the point supports and then welding. The track is now ready for use.

OVERVIEW OF INSTALLATION OF GETRAC® A3

SURVEYING AND LAYING OF THE HYDRAULICALLY BONDED LAYER (HBL)

- Staking out for the tracks is based on a network with highly exact, unstressed coordinates. The markings for the asphalt finishing machine can be used later for laying the rails.
- Laying of the HBL can take place with slipform paving machines that provide layer thicknesses of at least 300 mm.

LAYING THE ASPHALT SUPPORTING LAYER (ASL)

- The ASL has several sub-layers. It is laid by standard asphalt finishing machines with a high-compaction tamping beam.
- Lorries deliver the material required by the asphalt finishers. This means that asphalt installation is virtually independent of the outside temperature.
- A smooth-drum roller compacts the asphalt base course.

LAYING THE COVER LAYER

- The cover layer consists of asphaltic concrete or stone mastic asphalt. Laying also takes place by standard finishing machines.
- As for the ASL, a high-compaction tamping beam is also used here, to assure the required compaction over the entire width of the track.

RECESSES SAWN OUT FOR THE ANCHOR BLOCKS

- Recesses at exactly specified intervals are cut out of the asphalt.
- The exact positions of these recesses are determined by tacheometric surveying.
- The recesses are cut by a routing cutter. The edges of the cut recesses must be truly vertical (perpendicular), and the drilled depth must be at least 6 cm.

TRACK LAYING WITH TWO DELIVERY OPTIONS

- Installation of the tracks can take place with conventional track-laying machines.
- Delivery by railway wagon: here, the sleepers are transported by portal crane to the installation site, and are laid down onto the sleeper point supports by rail/road excavators.
- Transport by lorry: a wheel-mounted front-end loader with stacker function removes the sleepers at the side of the vehicle and takes them to the installation point. They are installed there and finally fastened in place.

TRACK ALIGNMENT

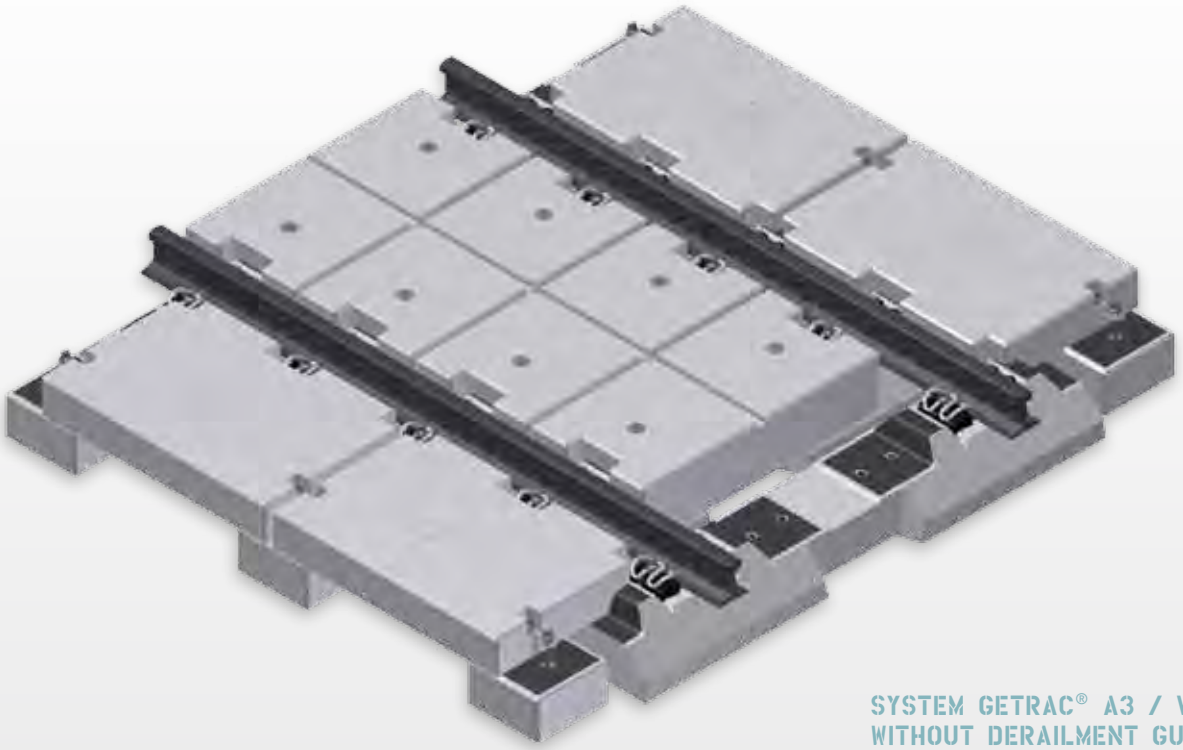
- Analogous to track construction with ballast, horizontal alignment is performed by a track-lining machine.
- To ensure optimal track positioning, millimetre-exact positioning of each individual point support is essential. This measurement procedure generates a “Plattel list”, which contains the required height for the intermediate layers for each point support.

CASTING OF THE ANCHOR BLOCKS WITH MORTAR

- Mortar is poured into the recesses for the anchor blocks. The quality of the mortar is supervised by the executing company and by outside verification. This fastens the anchor blocks permanently and with positive interlocking to the asphalt beneath.
- Use of very high-quality, low-shrinkage, mineral sealing mortar assures the permanent position of the track panel.

WELDING OF THE RAILS AND TIGHTENING

- As for ballasted tracks, intermediate and final welding takes place in accordance with the relevant regulations and directives. The final step is tightening of the rails at the point supports.



SYSTEM GETRAC® A3 / VARIANT
WITHOUT DERAILMENT GUARD

ROAD-VEHICLE ACCESS SYSTEM

New safety concepts for railway tunnels stipulate, in the case of tunnel accidents, the feasible rescue of passengers from tunnels by road vehicles. This concept is intended to allow local fire-brigade and rescue vehicles to drive into tunnels with single or dual tracks.

GETRAC® A3 makes this possible. The system can be slightly modified with minor adjustments at the sleepers (which are not relevant for official approval) in such a way that passenger cars and lorries can drive over the tracks. Additional reinforced-concrete elements are installed for this purpose to ensure surfaces over which approved road vehicles can perform rescue work.

The Road-Vehicle Access System consists of two elements. The first are the so-called central elements that rest directly on the wide concrete sleepers (with their exact heights) of the GETRAC® A3 system. The lower sides of these central elements are completely adapted to the form of the sleepers: they rest like a cap on the sleepers. This has two advantages: first, the central elements cannot rock back and forth; second, the cap form provides horizontal position security. The outer elements guarantee road vehicle access in the zone between the rails and the path at the edge of the track. The outer elements rest not only on the sleepers, but additionally on precast height-compensation components – and they extend over a total of two spaces (cribs) between the sleepers.

The central elements are fixed to the sleeper and held down there by a combination of bolts and double spring washers. They are mechanically installed with conventional track construction machines, similarly to the installation of sound absorbers.

The new Road-Vehicle Access System allows the GETRAC® A3 model to be adapted, with slight modifications, to the new and more stringent safety standards. Moreover, the Road-Vehicle Access System can be applied not only in tunnels, but also at grade, over bridges, and for other civil-engineering structures – which makes this system virtually universally applicable.

BENEFITS OF THE GETRAC® BALLASTLESS TRACK

- Permanent assurance of track geometry by elastic connection of the track panel with the asphalt, by means of GETRAC® anchor blocks and by exploitation of the thermoplastic properties of the asphalt
- Great degree of mechanization and small number of steps of work in laying the track panels
- Pre-assembly of the anchor blocks and rail fastening at the factory
- Long life cycle with very little maintenance effort
- Short construction time
- Use of conventional road and railway construction machines
- Possibility of rail superelevation up to 180 mm
- Great track stability
- Unhindered drainage of precipitation
- Fast availability of the track after its installation and in case of repairs
- General approval granted by the German Federal Bureau of Railways (EBA)

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