

INFORMATION SHEET - HPQ

Manufacturer-related product qualification for rail vehicle parts



BASIC PRINCIPLES

Manufacturer-Related Product Qualification (HPQ) is a verification of qualification that Deutsche Bahn AG demands from its contractors and their subcontractors for specific processes or for the manufacture of specified products.

These principles are based on the current state of the art, that is, the current standards (EN and DIN standards, railway standards, Deutsche Bahn standards, UIC leaflets, guidelines issued by the Association of German Engineers (VDI), and so on).

HPQ is an instrument with which Deutsche Bahn AG qualifies the manufacturer to produce specified products intended for Deutsche Bahn AG by classifying them into product groups (PG), manufacturing steps and material groups (WG).



HPQ is **not intended to replace additional quality measures** from Deutsche Bahn AG (assessment of quality capability (Q status), first article inspections, delivery approvals) or other product tests (service life test, fatigue test, type test, and so on).

The HPQ requirement for a component is defined in the "List of rail vehicle products subject to quality inspection" (LgP), Part B, column "HPQ". HPQ is required if the manufacturer's product designation does not correspond to the designation from the LgP, but the component occupies the role of a product that is subject to HPQ.

APPLICATION AND DOCUMENTS

The first step is to submit an HPQ application. The following three HPQ applications are available:

- Application - rail vehicle parts - components other than product group PG 2 (wheelset components)
- Application - wheelset - for monobloc wheel, axle, wheelset, tyre, wheel centre, and input raw material for the aforementioned components
- Application - wheelset raw material manufacturer

The applicant will not incur any costs in relation to submitting the HPQ application and the preparation of a quotation. Costs will only be incurred once an HPQ order has been placed.

The above applications and the list of rail vehicle products subject to quality inspection (LgP) are available in the Deutsche Bahn AG supplier portal at:

➤ [Schienenfahrzeuge und -teile](#)

Link to the Supplier Portal: [Supplier Portal - Choose language GB - General Documents](#)

Please send all enquiries and applications to **HPQ-SFZ@deutschebahn.com**

IMPLEMENTATION AND SCOPE

HPQ is used to assess the effectiveness of the quality system in terms of an ability to reproduce the characteristics of a product.

When performing HPQ at the manufacturer's site, the audit consists of three sub-steps:

System audit: technical sales, production planning and control, document management, human resources, technical purchasing, measuring equipment management and calibration

- Process audit: manufacturing, quality assurance
- Product audit: product tests in the manufacturer's testing laboratory and in an external testing laboratory certified in accordance with EN ISO/IEC 17025 or at DB Systemtechnik GmbH

The scope of HPQ comprises the following:

- Product group (PG)

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- Manufacturing steps
- Material group (WG)

The product is assigned to the product group (PG) on the basis of the **consecutive number** (LgP no.) in the list of rail vehicle products subject to quality inspection (LgP) and Appendix A. Products subject to HPQ are classified into the following product groups (PG):

- PG 1: Windscreen EN 15152, BN 918 511
- PG 2: Axle EN 13261, DB BN 918 275
- PG 2: Monobloc wheel EN 13262, DB BN 918 277
- PG 2: Wheelset EN 13260, DB BN 918 274, UIC 813 V
- PG 2: Wheel centre UIC 812 V, DB BN 918 276
- PG 2: Tyre UIC 810 V, DB BN 918 048, DB BN 918 049
- PG 2: Cast wheel centre BN 918 279
- PG 3: Axlebox rolling bearing EN 12080, DBS 918 004-01
- PG 3: Rolling bearing rings DBS 918 004-01
- PG 4: Axlebox housing DBS 918 058
- PG 5: Coil spring EN 13298, UIC 822 V
- PG 5: Spring leaf EN 14200, UIC 821 V
- PG 6: Brake disc E BN 918 278
- PG 6: Hub for brake disc E BN 918 278
- PG 7: Large casing (see Appendix A)
- PG 8: Draw hook EN 15566
- PG 10: Drawbar EN 15566, UIC 825 V
- PG 11: General components (see Appendix A)
- PG 12: Brake triangle UIC 833 V
- PG 12: Brake blocks BN 918 179, UIC 832 V
- PG 12: Suspension link BN 918 192
- PG 12: Draw hook pins for drawbar EN 15566, UIC 825 V
- PG 12: Screw coupling: draw hook pins, looped coupling links, coupling links, trunnion nuts, coupling screws EN 15566, UIC 826 V

The following inclusion options are available for these qualified product groups (decision by the responsible auditor from Deutsche Bahn AG):


Product group (PG)	Inclusion of other products <u>within</u> the product group	Inclusion of other product groups
PG 1 - Safety glass	Yes, in the respective pane thickness	No
PG 2 - Wheelset components	No (exception: raw material supplier for monobloc wheel, wheel centre)	11
PG 3 - Axlebox	In the respective rolling bearing type	No
PG 4 - Axlebox housing	Yes	7, 11
PG 5 - Springs	In the respective type (compression springs or leaf springs)	No, usually other materials
PG 6 - Brake disc/hub	Brake discs include hubs	7, 11
PG 7 - Large casing	Yes	11
PG 8 - Draw hook	Depending on the design	11
PG 10 - Drawbar	Depending on the design	11
PG 11 - General components	Yes	No (after testing PG 12 components, if necessary)
PG 12 - General components with additional testing	No	No

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HPQ must be verified for the following manufacturing steps **only**:

General manufacturing steps subject to HPQ	
Casting	Heat treatment
Forging, hot forming	
Additive manufacturing (e.g. 3D printing)	
 The following processes must be audited along the entire manufacturing process: hot forming, casting, additive manufacturing and heat treatment. Any potential external heat treatment must also be audited. Only (internal/external) heat treatments qualified by Deutsche Bahn AG are permitted in the manufacturing process for components subject to HPQ.	
Special component-related manufacturing steps subject to HPQ	
Finish machining	Axle, monobloc wheel, wheel centre, tyre, axlebox, axlebox rolling bearing, rolling bearing, axlebox housing
Joining	Transverse or longitudinal press-fitting (wheelsets, final drive)
Molybdenum coating	Axle
Roller burnishing	Axle
Induction surface hardening	Axle
Manufacture of windscreens	



If components subject to HPQ are manufactured as a pure **welded structure**, HPQ is **not required**. The regulations concerning welded structures are described in Guideline 951.0010.



A certificate of proficiency in the welding of railway vehicles and vehicle components in accordance with **EN 15085-2 and Guideline 951** is required in order to **carry out any welding work on products** for DB AG or for one of its suppliers.

For casting, materials are classified into the following material groups (WG):

- WG G1 Aluminium EN 1706
- WG G2a Steel (normalised) EN 10293, EN 10213, ISO 3755, SEW 520, SEW 685 or similar
- WG G2b Steel (quenched and tempered) EN 10293, EN 10213, ISO 3755, SEW 520, SEW 685 or similar
- WG G3 Ausferritic (ADI) GJS EN 1564
- WG G4 GJS EN 1563
- WG G5 GJL EN 1561

For forging and hot forming, materials are classified into the following material groups (WG):

- WG S1 Mild steel EN 10025
- WG S2 Unalloyed quenched and tempered steel ISO 683-1
- WG S3 Alloyed quenched and tempered steel ISO 683-2
- WG S4 Aluminium EN 573, EN 586
- WG S5 Steels for springs EN 10089
- WG S6 Rolling bearing steel ISO 683-17

For product groups PG 1, PG 2 and PG 12 (brake blocks), the materials are shown separately.

The following inclusion options are available for these qualified product groups (decision by the responsible auditor from Deutsche Bahn AG):

Casting	Forging, hot forming
WG G3 includes WG G4 and WG G5 WG G4 includes WG G5 WG G2b includes WG G2a	WG S3 includes WG S2 and WG S1 WG S2 includes WG S1

Only windscreen manufacturers will be qualified. Side windows or windows in the vehicle interior can be supplied without HPQ. The requirements of BN 918 511 must be observed here.

Following an inspection of the drawing, the Quality Assurance & Procurement of Rail Vehicles and Rail Vehicle Parts department at Deutsche Bahn AG will determine, on a case-by-case basis, whether HPQ is required for rubber-metal parts. If qualification is necessary, this will be carried out solely for the cast or forged components contained therein.

REQUIRED REFERENCE PRODUCTS AND VALIDITY

The following applies to the product groups PG 1, PG 4, PG 5, PG 7 and PG 11:

- In order to qualify all products within a product group, only one product from the product group is required, in an agreed quantity, as a reference component for (internal and/or external) product testing.
- A component subject to HPQ will be deemed to have been verified if the product group (PG), manufacturing steps and material group (WG) are identified within the scope of HPQ. An example is provided below:

Product group (PG)/product	Manufacturing steps	Material groups (WG)
PG 4: Axlebox housing DBS 918 058	Casting EN 1559	WG G4 GJS EN 1563
PG 7: Large casing	Heat treatment	WG G5 GJL EN 1561
PG 11: General components		

The following applies to the product groups PG 2, PG 3, PG 6, PG 8, PG 10 and PG 12:

- For qualification, each individual product for each product type or product design is required, in an agreed quantity, as a reference component for (internal and/or external) product testing.
- A component subject to HPQ will be deemed to have been verified if the product/type/design is identified in the product group (PG), manufacturing steps and material group (WG) within the scope of HPQ. An example is provided below:

Product group PG 2 Product	Manufacturing steps	Material group (WG)/category Comment
Monobloc wheels in accordance with DIN EN 13262 and DB BN 918 277	Hot forming Heat treatment Finishing	WG A - ER7, ER8 WG B - ER9 Category 1 in wheel groups I; II; III; IV and V (BA 318/319; ROLA)

Product group (PG)/product	Manufacturing steps	Material groups (WG)
PG 3: Axlebox EN 12080, DBS 918 004-01 Cylindrical roller bearing, tapered roller bearing and their units	Heat treatment Machining	WG S6 Rolling bearing steel ISO 683-17

PERIOD OF VALIDITY AND CONDITIONS

The period of validity for HPQ is generally three years. However, the period of validity for HPQ for PG 1 (Windscreen) is five years and the period of validity for HPQ for steelworks relating to PG 2 (Wheelset component) is six years. If HPQ is to be extended, an application must be submitted six months prior to the expiry of the validity of HPQ. The type and scope of requalification will be decided on a case-by-case basis.

HPQ is valid for a specific location only, whereby a change of production site will generally result in its expiry.

The Quality Assurance & Procurement of Rail Vehicles and Rail Vehicle Parts department at Deutsche Bahn AG must **always** be informed of:

- a relocation of essential machining steps and manufacturing processes
- significant changes to the manufacturing process (e.g. new heat treatment line)

The type and scope of necessary measures (e.g. new on-site inspection, material testing) will be decided on a case-by-case basis.

Qualification may be revoked if significant quality issues arise that cast doubt on the current HPQ status or if a manufacturer disregards important conditions of qualification.

EXTENSION OF SCOPE

At the manufacturer's request, the scope of HPQ can be extended or changed if the requirements for HPQ continue to exist. The Quality Assurance & Procurement of Rail Vehicles and Rail Vehicle Parts department at Deutsche Bahn will determine the necessary measures on a case-by-case basis.

APPLICABLE DOCUMENTS

- List of rail vehicle products subject to quality inspection (LgP)
- List - Manufacturer-related product qualification of wheelset components
- Guide - Manufacturer-related product qualification (HPQ)

The aforementioned documents can be requested by sending an e-mail to HPQ-SFZ@deutschebahn.com.

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Appendix A - Classification of components into product groups

LgP no.	Component designation	Comment
Product group 1 - Safety glass		
340	End wall window, windscreen (incl. windscreen heating system)	
Product group 2 - Wheelset components		
450	Wheelset (complete)	
452	Monobloc wheel	
454	Wheel centre	
455	Tyre	
461	Hollow/solid axle	
462	Hollow axle/hollow drilling	
463	Molybdenum-coated axle/molybdenum coating	
Product group 3 - Axlebox		
468	Axlebox rolling bearing	
469	Rolling bearing components: inner ring, outer ring	
Product group 4 - Axlebox housing		
466	Axlebox housing	
Product group 5 - Springs		
390/419	Coil springs	
395/423	Leaf spring (complete)/spring leaf (individual)	
Product group 6 - Brake discs and hubs		
1597-1	Friction rings and brake disc segments	Blanks, unmachined
1597-2	Hub	
Product group 7 - Large casing		
268	Coupler head, coupling head/coupling head casing/catcher	
800	Gear case	
820	Traction motor casing	
843	Quill shaft, hollow axle	
846	Hollow axle casing	
850	Gear case	
947	Brake shaft, hollow brake shaft	
Product group 8 - Draw hook		
300	Draw hook	
Product group 10 - Drawbars		
308	Drawbar, forked drawbar	
Product group 11 - General components		
171	Bracket/bearing block/suspension (force transmission between the running gear/bogie and the vehicle body)	Vehicle body - weld-on parts, vehicle body fittings and structures
285	Central articulated joint, vehicle body joint	Buffing and draw gear, coupler
293	Components such as plungers, tappets and buffer heads	Buffing gear - side/plunger buffers, complete, crash buffers
295	Shock absorbing elements (steel, reversible, e.g. ring springs, friction springs)	Shock absorbing elements
372	Solebar, bogie solebar, swan-neck bearer	Running gear/bogie (complete) - load-bearing structures, frame/bogie frame, running gear frame
373	Crossbearer	
376	Bolster swing link	
377	Bogie bolster/cross member	
378	Spring beam	
397	Suspension, spring bearing, spring guide	
400	Suspension bracket	
401	Spring suspension link pin	
414	Axle guard	
426	Cross member, spring beam	
444	Yaw damper bracket, rotation damper bracket	Pneumatic spring system (complete)
447	Torsion shaft, torsion bar	Rotation stabilisation system, yaw stabilisation system
467	Bearing sleeves	Suspension, damping, wheel(set) guidance - elements of frictional resistance to rotation
484	Push-pull rod, link rod	Axlebox complete (axlebox rolling bearing)
485	Coupling element/coupling rod	
486	Traction linkage casing	
488	Bogie stop block	
492	Bogie pin, pivot pins	Running gear-vehicle body connection - linkage, traction linkage, longitudinal linkage
497	Centre casting upper/lower	
498	Slewing ring	
		Bogie pin, centre casting, slewing ring

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LgP no.	Component designation	Comment
501	Torsion bar (including lever), torsion shaft	Anti-roll bar system
502	Push-pull rod for torsion bar	
503	Anti-roll bar bearing	
509	Pendulum for torque reaction bar	Torque reaction bar
531	Brake suspension system (e.g. from brake beam inter alia)	HPQ for components with a supporting/counter-bearing role
532	Damper mounting brackets	Running gear - fittings/auxiliary function - brackets, suspension systems
544	Tilting crossbeam including suspension	Tilt system - actuating elements - tilting mechanism, mechanical
545	Bolster swing link, tilting pendulum	
546	Ball-and-socket joint, articulated joint	
547	Bogie bolster	
548	Pendulum carrier, pendulum connection	
707	Supporting frame, supporting structure for generator, stator frame	Power supply - main generator system (traction generator) - generator (complete) in the vehicle - generator (complete) below/on the vehicle
821	End bracket: drive end and non-drive end	Drive system - drive, traction motor, gearbox
836	Traction motor and drive suspension system pendulum	Traction motor suspension/traction suspension system (complete)
872	Driving rod, coupling rod	Rod drive, chain drive
874	Torque reaction bar	
954	Brake guide rail	Brake system, brake actuating elements - transmission of forces - brake calliper unit
955	Brake calliper lever/brake lever	
956	Bracket	
957	Casing HPQ	
958	Main suspension/mounting (bolts, suspension shackle inter alia)	
961	Main suspension/mounting (bolts, suspension shackle inter alia)	Brake block unit, block brake (self-contained)
962	Lever	
963	Casing	
967	Brake drum	
978-2	Brake beam, brake flange, brake support of the retarder	
998	Integral beam	Linear eddy-current brake ECB (complete)
999	Carrier	
1000	Track rod complete, retaining bracket	
1001	Brake transfer lever, braking force transfer lever, complete	Linear eddy-current brake ECB (complete) - suspension/lowering system (complete)
1005	Clamp, bracket	
1008	Supporting frame	Magnetic track brake (complete)
1009	Track rod (complete)	
1010	Track rod head	
1012	Pull bow, thrust bow	
1013	Driver, driver stem, driver stop	
1014	Suspension stand	
Product group 12 - General components with additional testing		
402	Suspension link	
978-1	Brake triangle	
969	Brake blocks	
304	Draw hook pins, looped coupling links, coupling links, trunnion nuts, coupling screws	Screw coupling
311	Draw hook pins	Drawbar