Mercedes-Benz	**Supply Specification** **Hoses and hose assemblies for power-assisted steering and level control**	**DBL 6260** **BQF available** ☒

Additional DaimlerChrysler Standards required:
DBL 5555, DBL 8585, MBN 10 136, MB Special Terms

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Refer to Section Changes on page 4

Application:

High-pressure (HP), return and suction hose for power-assisted steering and level control. HP hose assemblies for power-assisted steering and level control are intended for power transfer and for reducing the pressure pulses generated by the pump.

Product versions (PV)	max. temperature (approx. °C) for long-term exposure	max. temperature (approx. °C) for short-term exposure (approx. < 10 h)	System/Oil	Recommended polymer type for inner layer
10	100	120	Power-assisted steering ATF	NBR
12	80	100	Level control ZHM	NBR, ECO, CSM
20	120	140	Power-assisted steering ATF	ECO, CSM, AEM
22	100	120	Standard hydraulics central hydraulic oil	ECO, CSM, AEM
23	100	130	Power-assisted steering, ABC Pentosin	CSM, AEM, HNBR
24	130	150	Power-assisted steering Pentosin	AEM
30	130	150	Power-assisted steering ATF	HNBR
32	130	150	Power-assisted steering Pentosin or Texaco	ACM
40	130	150	Power-assisted steering ATF, Pentosin	PTFE

Explanation: Pentosin = Pentosin CHF 11S; Texaco = Texaco PSF 9109

Abbreviated designations:
For drawings in the block for material: e.g. Elastomer hose assembly DBL 6260.10.

1 General

1.1 As-supplied condition

Hose assemblies may consist of hose or tube assemblies or a combination of these assemblies whose ends are provided with connection fittings.

They shall be supplied ready for installation in accordance with the drawing and the released initial sample.

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1.2 Packaging

DC packaging specifications in accordance with MB Special Terms as well as the packaging requirements relating to individual item numbers shall be observed.
The packaging shall be provided so that no ingress of dirt is possible until assembly. To prevent any loss and damage of the sealing rings and the threads, the hose assemblies shall be provided with protection caps at the fittings.

1.3 Dimensions and tolerances

Refer to drawing.

2 Requirements

2.1 General instructions

The general conditions laid down in DBL 5555 shall be observed.
In addition, the "Purchase Conditions for Production Materials and Spare Parts for Motor Vehicles", "Quality Management Agreements" and "MB Special Terms" are deemed constituent parts of the agreement.
For the functional tests on the hose, Mercedes-Benz Standard 10 136 shall apply in addition.
For each hose type, the hose manufacturer shall assign a hose type designation. This hose type designation shall uniquely identify the hose dimensions (e.g. diameter, wall thickness, but not length), the materials (inner and outer hose and textile reinforcement) as well as the manufacturing process.
After a hose type designation has been approved by DC, the hose type approval is transferred to the individual hose versions with each initial sampling process.

2.2 Condition of the parts

The hoses/hose assemblies shall be free of defects which would impair their utilization and assembly properties. These defects include, for example.
Surface defects such as blisters, sunk spots, waviness and inhomogeneities in the individual materials and their combination, improper shape or attachment of the connection fittings.
In their as-supplied state, hoses shall be dry and free of the following impurities on their inner and outer surfaces, for example: sliding and release agents in powder or liquid/paste form, foreign bodies and other substances such as abrasion and residue from surface treatment.

3 Materials

	Recommended polymer base		**Textile reinforcements**	
PV	Inside layer	Outside layer	HP hose	Return /Suction hose
10	NBR	CR	min. 2 x	min. 1 x
12	NBR, CSM, ECO	CR, CSM, ECO	min. 2 x	min. 1 x
20	CSM, ECO, AEM	CSM, ECO, AEM	min. 2 x	min. 1 x
22	CSM, ECO, AEM	CSM, ECO, AEM	min. 2 x	min. 1 x
23	CSM, AEM, HNBR	CSM, ECO, AEM, HNBR	min. 2 x	min. 1 x
24	AEM	CSM, ECO, AEM	min. 2 x	min. 1 x
30	HNBR	CR, HNBR	min. 2 x	min. 1 x
32	ACM	ACM	min. 2 x	min. 1 x
40	PTFE	Stainless steel braid[1)]		

[1)] in accordance with DIN EN 10088-1. Fabric shall be free of defects. If single wire flashover occurs in the fabric, the supplier shall prove that function and life are not impaired.

For the compact hose, deviations in the number of layers are possible.
A corresponding agreement shall be reached with the Steering Systems department before sampling.

3.1 Requirements

3.1.1 Hose outer layer

Refer to Table 1.

3.1.2 Hose inner layer
Refer to Table 2.

3.1.3 Textile reinforcements
During sampling, the type and structure of the thread and braid shall be indicated in detail, such as material (chemical basis), number of carriers, thread count and number of layers.

3.1.4 Separation resistance
The separation resistance of the individual layers shall be determined in accordance with DIN 53530. On delivery, the separation resistance shall be > 2,0 N/mm for material bought by the meter and > 1,5 N/mm for molded hoses. For expansion hoses, the separation resistance shall be > 2,5 N/mm, and after the pulse pressure tests (s. MBN 10136, Section 2.1.1), the separation resistance shall be > 1,0 N/mm. Evaluation in accordance with DIN 53539, method B.
This requirement does not apply to hoses and hose assemblies in accordance with PV .40.

3.1.5 Surface protection of metal parts

Steel parts shall be provided with coatings corresponding at least to corrosion protection class V (except for DBL 8451.86). For connection fittings, product versions in accordance with DBL 8451.72 or 8451.76 (edition 07/05) shall be used. The screw-connection behavior of the new Cr(VI)-free coatings shall be tested.

3.1.6 Fittings, tubes
Refer to drawing.

The hose fittings shall be manufactured from steel in accordance with DBL 4023 in crack test quality. The treatment condition and the strength of the parts shall conform to the drawing or sample. Extruded parts, e.g. from St 34, C 15, are acceptable provided that they comply with the strength and functional requirements.

Seamless tubes in accordance with DIN EN 10305-1 shall be used as tubes. Welded tubes in accordance with DIN EN 10305-2 may be approved after successful trials at DaimlerChrysler AG and tested quality capability of the tube manufacturer.
The treatment condition and the strength of the parts shall conform to the drawing or sample.
The supplier shall ensure that the parts are free of cracks and defects by means of suitable testing.

3.1.7 Clamps, protective hoses, insulations
Refer to drawing.

4 Marking

4.1 Hose
The hose (hoses bought by the meter and molded hoses) shall be permanently marked along its whole length. The lettering shall be repeated at least once for every 250 mm. The marking of a heat-shrinkable sleeve is also permitted following agreement with DC.
The marking shall include the following:

Designation of hose type
Hose manufacturer's name / company logo
Date of manufacture (date of vulcanization)
Nominal width of the hose
Material (polymer designation) of the inner and outer layers
in accordance with VDA Recommendation 260

This marking requirement also applies in analogy to hoses and hose assemblies in accordance with PV .40. The supplier shall submit proposals for suitable marking to DC without further request.

4.2 Fittings
On the **socket** (in case of HP hose on pump side) / on the **ferrule** the following shall be indicated:
Date of assembly (week and year)
DC item number of the hose assembly
DC trademark type "C" in accordance with N 33015

5 Tests

5.1 General

The hoses shall be compatible with the oil used in the hydraulic system.
Approved oils are listed in the relevant "Approval of Procurement Sources".

5.2 Approval tests

5.2.1 Material

All tests listed in Sections 3.1.1 and 3.1.2.

5.2.2 Hose

Approval tests shall be carried out on test specimens submitted for the approval of a hose type. In case of any changes to hose types which have already been approved new approval tests shall be carried out on principle. Approval testing includes the following tests.

5.2.2.1 Pull-out force for hose assemblies

5.2.2.2 Test pressure

5.2.2.3 Burst pressure

5.2.2.4 Change in length

This requirement does not apply to hoses and hose assemblies in accordance with PV .40.

5.2.2.5 Increase in volume

This requirement does not apply to hoses and hose assemblies in accordance with PV .40.

5.2.2.6 Pulse pressure test

5.2.2.7 Insertion and withdrawal forces for hoses assembled with hose clamp and strap assemblies

5.2.2.8 Separation resistance in accordance with Section 3.1.4

This requirement does not apply to hoses and hose assemblies in accordance with PV .40.

5.2.2.9 Corrosion resistance in accordance with Section 3.1.5

For tests under 5.2.2.1 to 5.2.2.7, refer to Mercedes-Benz Standard (MBN 10 136).

6 Other applicable standards

DC standards:	MB Special Terms	Other standards	DIN 2391
	N 41001		DIN 2393
	N 33015		DIN 53 530
	MBN 10 136		DIN 53 539
	DBL 4023		VDA 260
	DBL 5555		VDA 675 102
	DBL 6623		VDA 675 106
	DBL 6640		VDA 675 205
	DBL 6645		VDA 675 210
	DBL 8451		VDA 675 211
	DBL 8440		VDA 675 216
	DBL 8585		VDA 675 217
			VDA 675 301
			VDA 675 310
			VDA 675 311

Changes

Adoption of PV .32

Table 1

3.1.1	**Requirements for the hose outer layer**							
			Limit requirements				Permitted tolerance with reference to sample value[1)]	Test methods
	Product versions		10, 12	20, 22, 23	24, 30	32		
3.1.1.1	Density	g/cm³	indicate when sampling				+/- 0,02	Buoyancy method VDA 675 106
3.1.1.2	Shore A hardness		65 - 80				+/- 5	VDA 675 102
3.1.1.3	Tensile strength	N/mm²	> 10	> 10	> 10	> 10	+/- 5	VDA 675 205
3.1.1.4	Elongation at break	%	> 200	> 200	> 200	> 160	+/- 100	VDA 675 205
3.1.1.5	Tear propagation resistance	N/mm	> 5	> 4	> 5	> 8 > 4	+/- 3	VDA 675 210 VDA 675 211 B
3.1.1.6	Compression set	%	< 50	< 60*	< 50	< 50	+/- 5	VDA 675 216 B or VDA 675 217 B Exposure time: (22 + 2) h Test temperature: PVs 10,12, 23,30: (100 +/- 2) °C PVs 20, 22, 24, 32: (125 +/- 2) °C
3.1.1.7	Cold reference value	°C	< - 30				+/- 3	DBL 5555, Sections 5 and 5.2.1
3.1.1.8	Resistance to ozone	Grade	0				-	VDA 675 311 Test temp.: (40 +/- 2) °C
3.1.1.9	Resistance to weathering	Grade	0				-	DBL 5555, Section 7
3.1.1.10	Resistance to heat aging							VDA 675 310
	Change in Shore A hardness		< + 12				+/- 5	
	Tensile strength	N/mm²	> 10	> 10	> 10	> 10	+/- 5	Exposure time: 42 d
	Change in tensile strength	%	< 20	< 20	< 20	< 15		Test temperature:
	Elongation at break	%	> 100	> 150	> 100	> 160	+/- 50	PVs 10,12,23,30: (100 +/- 2) °C
	Change in elongation at break	%	< 50	< 40	< 30	< 25		PVs 20, 22, 24, 32: (125 +/- 2) °C
3.1.1.11	Resistance to oil							
	Change in Shore A hardness		+/- 12				+/- 5	VDA 675 301,
	Change in volume	%	+ 30/- 5			+ 10/- 3	+/- 5	Section 2.2.2
	Tensile strength	N/mm²	> 8			> 10	+/- 5	Test fluid: apply to Materials
	Elongation at break	%	> 100			> 160	+/- 50	Engineering Exposure time: 7 d Test temperature (100 +/- 2) °C

*) For CSM < 75 % [1)] refer to DBL 5555, Part II, Section 3

Table 2

3.1.2	**Requirements for the hose inner layer**							
			Limit requirements				Permitted tolerance with reference to sample value[1)]	Test methods
	Product versions		10, 12	20, 22, 23	24, 30	32		
3.1.2.1	Density	g/cm³	indicate when sampling				+/- 0,02	Buoyancy method VDA 6751 06
3.1.2.2	Shore A hardness		65 - 80				+/- 5	VDA 675 102
3.1.2.3	Tensile strength	N/mm²	> 10		> 12	> 10	+/- 5	VDA 675 205
3.1.2.4	Elongation at break	%	> 160				+/- 50	VDA 675 205
3.1.2.5	Tear propagation resistance	N/mm	> 4	> 4	> 6	> 8 > 3,5	+/- 3	VDA 675 210 VDA 675 211 B
3.1.2.6	Tension / compression set	%	< 60	< 60*	< 60	< 60	+/- 5	VDA 675 216 B or VDA 675 217 B Exposure time: (22 + 2) h Test temperature: PVs 10, 12, 23: (100 +/- 2) °C PVs 20, 22: (125 +/- 2) °C PVs 24, 30, 32: (150 +/- 2) °C
3.1.2.7	Cold reference value	°C	< 25				+/- 3	DBL 5555, Sections 5 and 5.2.1
3.1.2.8	Resistance to oil 7 d and 42 d							VDA 675 301
	Change in hardness	Shore A	+/- 10			+/- 5	+/- 5	Exposure time: 7 d
	Change in volume	%	< 25			< 12	+/- 5	Test temperature:
	Tensile strength	N/mm²	> 12			> 10	+/- 5	PV 12: (100 +/- 2) °C
	Change in tensile strength	%	< 25			< 10		PVs 22, 23: (125 +/- 2) °C PVs 24, 30, 32, 40: (150 +/- 2) °C
	Elongation at break	%	> 100			> 160	+/- 50	Exposure time: 42 d
	Change in elongation at break	%	< 50			< 25		Test temperature: PV 12: (80 +/- 2) °C PVs 10, 22, 23: (100 +/- 2) °C PVs 20, 24, 30, 32, 40: (125 +/- 2) °C Test fluid: PV 12: "Aral Vitamol ZHM“ PVs 10, 20, 30: "Steering oil MB“ by DEA PV 22: "Central hydraulic oil 5364 B“ by DEA PVs 23, 24, 32: Pentosin CHF-11S

*) For CSM < 75 %. [1)] refer to DBL 5555, Part II, Section 3.

Table 3

3.1.2	**Requirements for the hose inner layer**				
			Limit requirements	Permitted tolerance with reference to sample value[1)]	Test methods
	Product versions		40		
3.1.2.1	Density	g/cm³	indicate when sampling	+/- 0,02	ISO 1183
3.1.2.3	Tensile strength	MPa	> 20	+/- 5	ISO 527
3.1.2.4	Elongation at break	%	> 220	+/- 100	ISO 527
3.1.2.8	Resistance to oil 7 d and 42 d				in analogy with VDA 675 301
	Change in hardness	Ball indentation hardness	#)	+/- 5	ISO 2039/1
	Change in volume	%	#)	+/- 5	ISO 527
	Tensile strength	MPa	#)	+/- 5	
	Change in tensile strength	%	#)		Exposure time: 7 d Test temperature: PV 40: (150 +/- 2) °C
	Elongation at break	%	#)	+/- 15	Exposure time: 42 d Test temperature: PV 40: (125 +/- 2) °C
	Change in elongation at break	%	#)		Test fluid: PV 40: "Steering oil MB" by DEA and Pentosin CHF-11S

#) Indicate when supplying samples; values to be determined later.