

KNOTT-AVONRIDE LTD
Welcomes You To Our
Trailer Type Approval Seminar

O₁ & O₂ Trailers

What You Can Do To Help Yourself?

- **Minimise costs – initial and ongoing**
- **Limit effort and time required**
- **Plan for future products in approvals**
- **Anticipate versions and variants**
- **Carry over proven solutions**
- **Talk to Knott-Avonride Ltd**

KNOTT-AVONRIDE LTD

What WE Can Do To Help You

- Provide support during approval process

USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

What WE Can Do To Help You

Contact Details

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USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

Knott-Avonride Ltd supports its customers with documentation.

KNOTT-AVONRIDE LIMITED					Brake and Coupling Combinations KDS024														
Knott-Avonride Ltd Europa House Second Avenue Centre 130 Barton upon Trent Staffordshire DE14 2WP Tel: +44 (0) 1283 531541 Fax: +44 (0) 1283 534940 E-mail: sales@knottuk.com					Brake Type and Size														
					10-1305 180x45			30-33-1041 205x45			33-3420 205x45			25-3020 205x45			30-3201 305x45		
Coupling Type and Designation					A - 400kg per tyre (Tyre rad range 0.154m - 0.200m)			A - 500kg per tyre (Tyre rad range 0.200m - 0.260m)			A - 750kg per tyre (Tyre rad range 0.216m - 0.340m)			A - 900kg per tyre (Tyre rad range 0.253m - 0.360m)			A - 1500kg per tyre (Tyre rad range 0.335m - 0.480m)		
					B - 500kg per tyre (Tyre rad range 0.215m - 0.300m)			B - 800kg per tyre (Tyre rad range 0.300m - 0.322m)			B - 900kg per tyre (Tyre rad range 0.305m - 0.330m)			B - 1150kg per tyre (Tyre rad range 0.370m - 0.410m)					
					C - 500kg per tyre (Tyre rad range 0.250m - 0.300m)						C - 900kg per tyre (Tyre rad range 0.215m - 0.252m)								
Coupling	Type	Coupling capacity	Variant		Single	Tandem	Ti	Single	Tandem	Ti	Single	Tandem	Ti	Single	Tandem	Ti	Single	Tandem	Ti
KF7.5	Delta Pressed Steel	380-750	C		✓	130-750	✗	480-750	✗	✗	✓	650-750	✗	✓	700-750	✗	850-750	✗	✗
KF11	Delta Pressed Steel	750-1300	C		750-1100	✓	1080-1300	✓	850-1300	✗	✓	850-1300	✓	✓	1050-1300	✓	900-1300	✗	✗
KF26	Delta Pressed Steel	1180-2900	A		✗	✓	✓	1180-1300	✓	1300-2900	1180-1600	✓	✓	1100-1000	✓	✓	1450-2000	✗	✗
KF27	Delta Pressed Steel	1480-2700	B		✗	✓	✓	1480-2000	✗	1480-2900	1480-1600	✓	✓	1400-1900	✓	✓	1800-2700	2950-2700	2800-2700
KF17.5	Pole Pressed Steel	380-750	C		✓	130-750	✗	480-750	✗	✗	✓	650-750	✗	✓	700-750	✗	850-750	✗	✗
KFV13	Pole Pressed Steel	750-1300	C		750-1100	✓	1080-1300	✓	850-1300	✗	✓	850-1300	✓	✓	1050-1300	✓	900-1300	✗	✗
KFV23	Pole Pressed Steel	1180-2900	A		✗	✓	✓	1180-1300	✓	1300-2900	1180-1600	✓	✓	1100-1000	✓	✓	1450-2000	✗	✗
KFV10	Pole Pressed Steel	1680-2900	B		✗	✓	✓	1680-2000	✗	1680-2900	✗	✓	✓	1600-1900	✓	✓	2100-3000	2950-3000	✗
KF011	Delta Cast	750-1300	C		750-1100	✓	1080-1300	✓	850-1300	✗	✓	850-1300	✓	✓	1050-1300	✓	900-1300	✗	✗
KF026	Delta Cast	1180-2900	A		✗	✓	✓	1180-1300	✓	1300-2900	1180-1600	✓	✓	1100-1000	✓	✓	1450-2000	✗	✗
KFQ27	Delta Cast	1480-2700	A1		✗	✓	✓	1480-2000	✗	1480-2900	1480-1600	✓	✓	1400-1900	✓	✓	1800-2700	2950-2700	2800-2700
KF036	Delta Cast	1680-2900	A		✗	✓	✓	1680-2000	✗	1680-2900	✗	✓	✓	1600-1900	✓	✓	2100-3000	2950-3000	✗
KFQ35	Delta Cast	2700-3500	D		✗	✗	2700-3000	✗	✗	✓	✗	2700-2900	✓	✗	✓	✓	✓	✓	3250-3500

✓ Suitable throughout the coupling's operating range.

✗ Unsuitable / Not Compatible

1180-1300 Only suitable between stated min and max.

Compatibility Selection Guide

When selecting the appropriate components for the trailer first choose a coupling with a suitable capacity for the Gross vehicle weight and mounting style, e.g. for a 2000kg trailer with delta for an A-Frame use either KF020 or KF20. Choose the size (the figures noted are the dynamic rolling radius) and number of tyres per trailer 2, 4 or 6. Calculate the maximum load capacity of your selection, a suitable brake type can then be chosen.

Example:

Compatibility Calculations and Approval Certificates for Brakes and Couplings are Available on Request.

The information here is intended as a guide. It is as accurate as we can make it at the time of printing, however, Knott-Avonride Ltd do not accept any responsibility for any inaccuracies which may be in the text. Any person relying on it should be aware that the information contained here must always be checked with the original documentation including any revision or additions to regulations, statements or the law.

Easy selection for components & systems.

Coupling Type and Designation				18-1365 160x35		
Coupling	Type	Coupling range(kg)	Variant	Single	Tandem	Tri
KF7,5	Delta Pressed Steel	350-750	C	✓	700-750	X

USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

What WE Can Do To Help You

- Provide support during approval process
- Provide documentation

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What Documents Can I Get?

- **Foundation brake approval**
- **Coupling approval**
- **Drawbar approval**
- **Brake Compatibility calculations for:-**
 - Coupling**
 - Brake**
 - Number of Axles**
 - Tyre Diameter**
 - Plated Gross Weight**
- **Lights & Reflector Certificates**
- **Wheels & Tyre Certificates**

Note that approvals are to EC Directives & UNECE Regulations

Example of Compatibility Calculation for 3500kg Trailer

3500kg
Coupling
Max/Min
2700kg

0,253
Min DRR

0,360
Max DRR

900kg
Per Brake

4
N° of Brakes

3500kg
Max GTW

COMPATIBILITY CALCULATION FOR TRAILERS
(Calculation acc. EC71/320 Annex VIII with all modifications till EC2007/101 from 01.01.2007)

KNOTT
Bremsen - Achsen

Calculation: KFG35-D - 4x 25-2825 (a)
Name: T82
Version: 30.09.2009
Page: 1/2

Control device EC-Testreport-Nr.: ABO - Nr.: Complete mass G_{max} Complete mass G_{max} Additional force K_{10} Usable overrun travel s_{10} Efficiency η_{LCP} Transmission of travel i_{LCP} Transmission of travel i_{LCP} Threshold limit K_{10} Max. compressive force D_{10} Max. pulling force D_{10} Lower L_{10} Lower transmission L_{10}	KNOTT GmbH KFG35-D 361-161-03 M1608 2700 kg 3500 kg 900 N 90 mm 0,9 1,67 4 975 N 2300 N 5800 N 100 mm 31 mm 3,23	2. Brake Manufacturer: Type EC-Testreport-Nr.: Certificate no. perm. brake capacity G_{DOP} Ø brake drum Nominal size p (Ø) Travel transmission L_{10} Min tension travel s_{10} Return force F_{10} max. dyn. Tyre radius dyn. R_{max} min. dyn. Tyre radius dyn. R_{min} max. brake torque M_{max} Return travel SR Reversing moment MR Travel transmission $L_{10} = s_{10}/s_{10}^*$	KNOTT GmbH 25-2825 (a) 361-105-81 Möln. 83222 900 kg 250 mm 1,076 m 16,00 1,7 mm 100 N 0,36 m 0,253 m 2000 Nm 29 mm 50 Nm 1,00
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3. Transmission device
Type: Brake rod
Scheme: S1437
Transmissions L_{10} : 1,00
EC-Testreport-Nr.: 12002

Quantity of brakes n : 4
Tyre size
 R_{min} : 0,253m
 R_{max} : 0,360m
max. gross weight G_{max} : 3500 kg

Weight	Necessary brake force	Perm. force on coupling	Min. dynamic radius	Max. dynamic radius	Force transmission	Threshold ratio	max. damping force	max towing force
G_{max} [kg]	F_{10}	D_{10}	dyn. R_{min} [m]	dyn. R_{max} [m]	Räderanzahl n_{10}	$100 \cdot D_{10}/G_{max}$	$100 \cdot D_{10}/G_{max}$	$100 \cdot D_{10}/G_{max}$
2700 kg	13230	2700	0,253	0,360	2,55	3,61	6,15	21,48
2800 kg	13720	2800	0,253	0,360	2,52	3,48	7,89	29,71
2900 kg	14210	2900	0,253	0,360	2,49	3,36	7,59	29,00
3000 kg	14700	3000	0,253	0,360	2,46	3,25	7,33	19,33
3100 kg	15190	3100	0,253	0,360	2,44	3,15	7,10	18,71
3200 kg	15680	3200	0,253	0,360	2,41	3,05	6,88	18,13
3300 kg	16170	3300	0,253	0,360	2,38	2,95	6,67	17,58
3400 kg	16660	3400	0,253	0,360	2,37	2,87	6,47	17,06
3500 kg	17150	3500	0,253	0,360	2,35	2,79	6,29	16,57

5. Compatibility
Max. brake torque on wheels
 $(\sum M_{max}) / (\sum R_{max} \cdot n_{max}) = 1,30$ (must be greater than 1,2)

Total Efficiency
 $\eta = \eta_{10} \cdot \eta_{LCP}$
0,9

max. perm. reverse moment
 $MR_{max} = (10,00 \cdot G_{max} \cdot R_{max}) / n$
126,00 Nm

Travel ratio
 s_{10}^* / s_{10}
3,21

Force transmission $(D_{10} \cdot R_{min}) / (n_{10} \cdot P_{10}) \cdot (D_{10} + K_{10}) / (G_{max} \cdot R_{min})$	≤	Lower transmission $i_{LCP} \times L_{10}$	≤	Travel transmission s_{10}^* / s_{10}
2,55	≤	3,23	≤	3,21

Example of Compatibility Calculation 71/320

Brake scheme
Calculation acc. 71/320/EWG Annex VIII incl. EC2007/101 from 01.01.2007)

KNOTT
Bremsen - Achsen

Version: 30.09.2009
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1. Control device		2. Brake	
Manufacturer:	KNOTT GmbH	Manufacturer:	KNOTT GmbH
Type:	KFQ35-D	Type:	26-2825 (a)
Kind of handbrake-lever:	Overcenter spring-pull (KH / GF)	EC-Transport-Nr.:	301-105-B1
EC-Transport-Nr.:	361-101-93	Cellcode no.:	M01n. 031222
Lever1 L1=	133 mm	perm. Brake capacity (BS)=	300 kg
Lever2 L2=	31 mm	Ø brake drum=	250 mm
Lever transmission iHG=	3,22	Nominal size r (R1)=	1,075 m
Lever3 L3=	297 mm	Travel transmission iG=	10,50
Lever4 L4=	75 mm	Rebrak force P=	100 N
Lever5 L5=	60 mm	max. dyn. Tyre radius dyn. Rmax=	0,36 m
min. braking force for break-away cable F _{max}	5000 N	min. dyn. Tyre radius dyn. Rmin=	0,250 m

3. Transmission device

Type:	Transmission H1=	Efficiency H1=	1,00
Quantity of brakes n	4	Tyre size	acc. Rmin & Rmax
min. gross weight (GArin)	2700 kg	Rmin	0,253m
		Rmax	0,360m
		min. gross weight (GARmax)	3500 kg

revelation transmission ratios

Total transmission ratio for handbrake-lever	$iHB = (L3 / L4) \cdot (L4 / L2) =$	12,8
Total transmission ratio for parking brake	$iR_{park} = i_{HG} \cdot iG =$	304,9
Total transmission ratio for emergency brake	$iRA = (L5 / L2) \cdot iG =$	34,1

4. Regulations for parking brake

max. permitted handforce	F _{Hand}	600 N
Min. req. braking force on foot	$B = G_{total} \cdot g \cdot 10\% =$	6100 N

5. Calculation

Required braking-moment	$M_B = B \cdot R_{max} =$	2255 Nm
Required force on balancer	$F1 = M_B / (r) + (n \cdot P_d) =$	2485 N
Req. force on beginning of brake-rod	$F2 = F1 \cdot i_{HG} / i_{RA} =$	3488 N
Req. force on handbrake-lever	$FH = F2 / i_{HG} =$	100 N

What WE Can Do To Help You

- Provide support during approval process
- Provide documentation
- Supply solutions not just product

USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

SUPPLY CHAIN

You are no longer just buying components to do the job.

TECHNOLOGY • PRODUCTS • SERVICE...

COUPLINGS

AXLES

KNOTT-AVONRIDE LIMITED

JOCKEY WHEELS & PROPSTANDS

ANCILLARIES

...THE COMPLETE PACKAGE!

The advertisement features a central logo for Knott-Avonride Limited. Surrounding the logo are four categories of products, each with a blue oval label and several images of the components. The top-left category is 'COUPLINGS', showing various metal fittings and bolts. The top-right category is 'AXLES', displaying different axle assemblies and wheels. The bottom-left category is 'JOCKEY WHEELS & PROPSTANDS', showing various types of wheels and stands. The bottom-right category is 'ANCILLARIES', showing a variety of small mechanical parts, including bearings and seals. The entire advertisement is set against a white background with a blue border.

You are buying certified and approved solutions.

COUPLINGS & BRAKES

Required Documentation:-

- **Coupling** : Directive 94/20 (couplings)
UNECE Reg 55

Directive 71/320 (braking)
UNECE Reg 13
- **Foundation Brake** : Directive 71/320
UNECE Reg 13
- All Knott-Avonride Ltd equipment will be dual approved to both EC Directives and UNECE Regulations.
- UNECE are accepted outside the EU, Australia (ADR), New Zealand, South Africa and others.



AXLES

Certification not required, however, application asks for:-

Drawing of suspension arrangement.

Type and design of suspension.

Knott-Avonride Ltd will support you with whatever documentation is needed.



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DRAWBARS

3 ways of achieving drawbar approval.



By Calculation

Paper process only

When?

Only applicable to simple designs

How?

- 1) ISO 7641 calculation and submit for approval
- 2) Contract out calculation and submit for approval
- 3) Test authority to make and approve the calculation

By Test

When?

This is the only option if the drawbar is more complex

How?

Must be carried out by a certified test house acceptable to the approval authority using a 2 million full load cycle test

Purchase Pre-Approved Drawbars Complete with Data Plate

It is essential to show that they are being used in accordance with the approval:-

- **Methods of Attachment.....Ratings.....Free Length**
- **Universal / Bespoke / Bolt on**
- **Weld on (raw) for fabrication into the chassis build**

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WHEELS & TYRES

Must be correctly rated for speed and load index.

E-mark tyres

6 year age rule in Germany

Certificate for actual tyres on test trailer

Allowable to substitute equivalent or better?

-Take care in any documentation to allow this

Consider specifying alternatives:-

- But must fall within minimum & maximum radii of
brake compatibility



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LIGHTING

The most significant change is the requirement for reversing lights which will be compulsory on O2 and optional on O1.

This means lighting schemes need to cover all the possible options, the approval needs to be pan European so:-

- Right hand fog, Left hand reverse for UK
- Left hand fog, Right hand reverse for Mainland Europe

We supply lamps and reflectors with the required certification.



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SPRAY SUPPRESSION

In the original framework directive 2007/46/EC spray suppression only applied to O3 and O4.



It is now a requirement on O1 and O2.

We supply mudguards & rainflaps

Providing they are installed correctly they comply with all the legislative requirements.

They come with an installation drawing clearly showing how they need to be fitted.

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STATUTORY PLATES

ECWVTA

- Compliant data plate
- WMI number allocation
- Chassis VIN stamping

NSS

- Compliant data plate
- WMI number allocation
- Chassis VIN stamping

You Could Do It the Hard Way.....

~ Register for WMI number with BSI ~

- Review the legislation and document process
- Design data plate
- Purchase plate blanks
- Purchase engraving machine
- Purchase chassis stamps
- Include plate and chassis in production process

.....Or The Easy Way

~ Register for WMI number with BSI ~

- Purchase approved pre-engraved plates with custom print from Knott
- Purchase chassis stamps
- Fit plate and stamp chassis

•	Knott -Avonride Limited	
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	<input type="text"/>	Kg
1 -	<input type="text"/>	Kg
2 -	<input type="text"/>	Kg
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KNOTT-AVONRIDE Limited			
Europa House, Second Avenue, Centrum 100, Burton Upon Trent. Staffordshire. DE14 2WF			
Type	<input type="text"/>	Variant	<input type="text"/>
Year	<input type="text"/>		
Tel 44 (0)1283 531541		www.knottuk.com	

USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

“APPROVED CHASSIS”

Chassis include:-

- Coupling
- Brakes
- Compatibility
- Wheels & Tyres
- RUPD
- Spray Control
- Statutory Plate



Other chassis solutions allow a trailer manufacturer to use multi-staged build:-

- Masses & dimensions
- Lighting
- Rear reg space



Advantages of buying approved components:-

- **Simplifies documentation**
- **Reduces manufacturing time**
- **Optimises production processes**
- **Minimises administration**
- **Simplifies supply base**
- **Maximises efficiency**

USE KNOTT-AVONRIDE LTD TO MINIMISE YOUR COSTS AND EFFORT

KNOTT-AVONRIDE LTD

What is the next step?

TECHNOLOGY

TECHNOLOGY • PRODUCTS • SERVICE...



KNOTT-AVONRIDE
LIMITED



...THE COMPLETE PACKAGE!

For further details visit our website www.knottuk.com

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