

Single Reduction

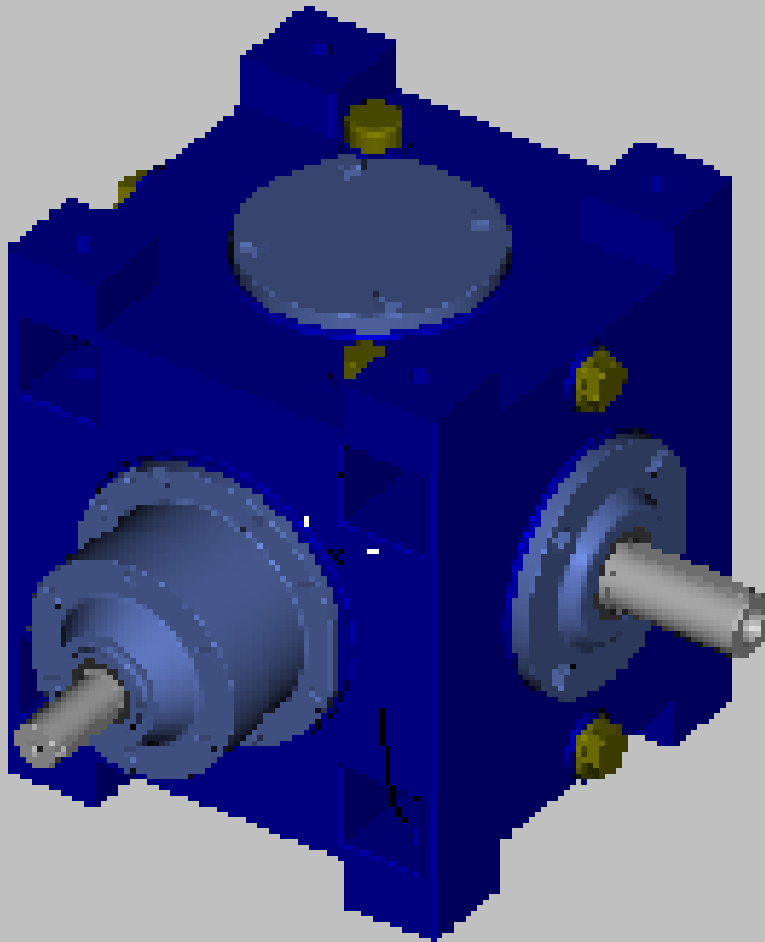
# GREAVES



PREMIUM

Right angle drives

B1/04/2000



*B1-SERIES*



# DET NORSKE VERITAS MANAGEMENT SYSTEM CERTIFICATE

Certificate No. RIN301-AQ-3008

*This is to certify that  
the Quality Management System  
of*

**GREAVES LIMITED**

**POWER TRANSMISSION UNIT - II**

*at*

B9 and B10, Falta Industrial Growth Centre, Sector-III, FALTA-743 504, INDIA

*has been found to conform to the Quality Management System Standard:*  
**ISO 9001:1994**

*This Certificate is valid for the following product or service ranges:*

**DESIGN, MANUFACTURE & SUPPLY OF INDUSTRIAL GEAR BOXES AND ITS  
ACCESSORIES.**

*Original Certification date:*  
10. May 1996

*Place and date:*  
New Delhi, 13. June 2002

*This Certificate is valid until:*  
15. December 2003



Accredited  
by the RvA

*for the Accredited Unit:*  
DNV CERTIFICATION B.V.,  
THE NETHERLANDS

A. Venkataram  
*Management Representative*

*Compliance to the Standard in respect to the indicated scope  
is verified by the DNV approved registered Team Leader:*

Saikat Basu  
*Lead Auditor*

Lack of fulfilment of conditions as set out in the Appendix may render this Certificate invalid.

**Single Reduction**



**PREMIUM**

# **GREAVES**

## **B1-Series Right Angle Speed Reducers**

Greaves' B1-Series' right angle gear drives in single reduction are intended to satisfy all modern requirements with high efficiency compact arrangements and longer life. They have wide spheres of applications for speed reducers, graduated in ratio from 1/1 to 4.13/1, transmitting power upto 1516 kW according to their size, ratio and speed.

This catalogue contains specification, dimensions and ratings for selection of standard drives against usual applications. Our engineers will be pleased to assist in case of unusual conditions attracting special requirements.

Greaves' B1-Series Single stage bevel gear units are suitable for paper rubber mills, Centrifugal pumps for boring holes, line shaft drives, crushing and rolling mills, Plastic industries, textile machinerys and wood working machines etc.

**S  
E  
A  
W  
E  
R  
G**

# GREAVES

## B1-Series Right Angle Speed Reducers

### *Specifications*

#### **Gears**

Spiral bevel gears and pinions are manufactured from high quality case hardened alloy steels. After case hardening, gears and pinions are profile lap- finished in matching sets to provide a highly efficient quiet running drive. All gear teeth are in-volute profile duly corrected as per the most modern methods which increases dedendum, bearing capacity and reduces noise level.

#### **Case**

The close grain cast iron case is of rigid construction with modern styling. They are suitably designed to dampen noise and vibrations. Housings can also be supplied made of fabricated construction, if required.

#### **Bearings**

Tapered roller bearings from reputed manufacturers are used throughout. These bearings have ample capacity to support heavy combinations of thrust and radial loads.

#### **Shafts**

Input shaft integral with bevel pinion is machined from case-hardening alloy steels. Direct hardening alloy steel is used in case of output and input shafts fitted with loose pinions. The cylindrical seats for bearings, wheel, seals, couplings and fan are finished by precision grinding. These are also adequately designed to accommodate external overhung loads as appropriate.

#### **Shaft Seals :**

The shaft extensions are fitted with spring loaded rubber seals to prevent out flow of oil and entry of dusts. In highly polluted areas and dusty atmospheres, labyrinth seals may also be provided, if required.

#### **Efficiency**

The efficiency for single reduction bevel gear drives is about 98.5%.

#### **Lubrication**

Lubrication of gears and bearings is entirely self-contained by 'positive splash'. Forced lubrication of top bearings and gear meshes can also be provided by motor driven pump in vertical units. In some cases, it is necessary to use forced lubrication with a separate oil tank also. These are marked with bold red colors in the 'Rating Table'. The unit is provided with combined dipstick, ventilator, and drain plugs. Oil capacities are indicated in the dimension table.

#### **Recommended Lubricants**

Oil Servomesh SP320 or equivalent.

#### **Cooling**

Depending upon the applications, standard gear units are cooled by :

- (a) Normal heat dissipation by convection from external source.
  
- (b) Separate Oil cooler incorporated in forced lubrication.

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## B1-Series Right Angle Speed Reducers

### *Selection*

#### **Selection Procedure :**

1. Calculate Gearbox ratio = Input speed / Output speed.
2. Select Gearbox size from Mechanical capacity.
  - 2.1. Determine type of load from **Table - III** (Uniform, Moderate or Heavy shock).
  - 2.2. Determine Mechanical service factor from **Table - I**.
  - 2.3. Calculate the required Mechanical power capacity (PM).

$$(PM) = \text{Absorbed power (kW)} \times \text{Mechanical service factor.}$$

- 2.4. Select Gearbox size from rating table.

PM must be **equal to or less** than the Mechanical rating of the Gearbox.

3. Thermal Rating check :
  - 3.1. Thermal Ratings are given for the following two cases :
    - (i) Gearbox without additional cooling.
    - (ii) Gearbox fitted with fan.

- 3.2. Determine the Thermal service factor from **Table -II**

- 3.3. Calculate the required Thermal power capacity.

$$(PT) = \text{Absorbed power (kW)} \times \text{Thermal service factor.}$$

- 3.4. Specify the type of cooling required by referring to Thermal rating tables.

PT must be **equal to or less** than the Thermal rating of the Gearbox.

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## B1-Series Right Angle Speed Reducers

*Mechanical & Thermal service factors  
Horizontal & Vertical installation*

**Table - I Mechanical Service Factors**

Prime Mover	Duration of Service per hour	Load Classification - Driven Machine		
		Uniform Shock	Moderate Shock	Heavy Shock
Electric Motor	Under 3	0.80	1.00	1.50
Steam turbines	3 to 10	1.00	1.25	1.75
Hydraulic Motor	Over 3	1.25	1.50	2.00
Multi-Cylinder	Under 3	1.00	1.25	1.75
Internal Combustion Engine	3 to 10	1.25	1.50	2.00
	Over 3	1.50	1.75	2.25
Single-Cylinder	Under 3	1.25	1.50	2.00
Internal Combustion Engine	3 to 10	1.50	1.75	2.25
	Over 3	1.75	2.00	2.50

**Table - II Thermal Service Factors**

Type of Cooling	Ambient temp. ( °C )	Running time in any hour				
		100%	80%	60%	40%	20%
Gearbox without additional Cooling	10	1.12	1.34	1.57	1.79	2.05
	20	1.00	1.20	1.40	1.60	1.80
	30	0.88	1.06	1.23	1.41	1.58
	40	0.75	0.90	1.05	1.20	1.35
	50	0.63	0.76	0.88	1.01	1.13
Gearbox with Fan Cooling	10	1.15	1.38	1.61	1.84	2.07
	20	1.00	1.20	1.40	1.60	1.80
	30	0.90	1.08	1.26	1.44	1.62
	40	0.80	0.96	1.12	1.29	1.44
	50	0.70	0.84	0.98	1.12	1.26

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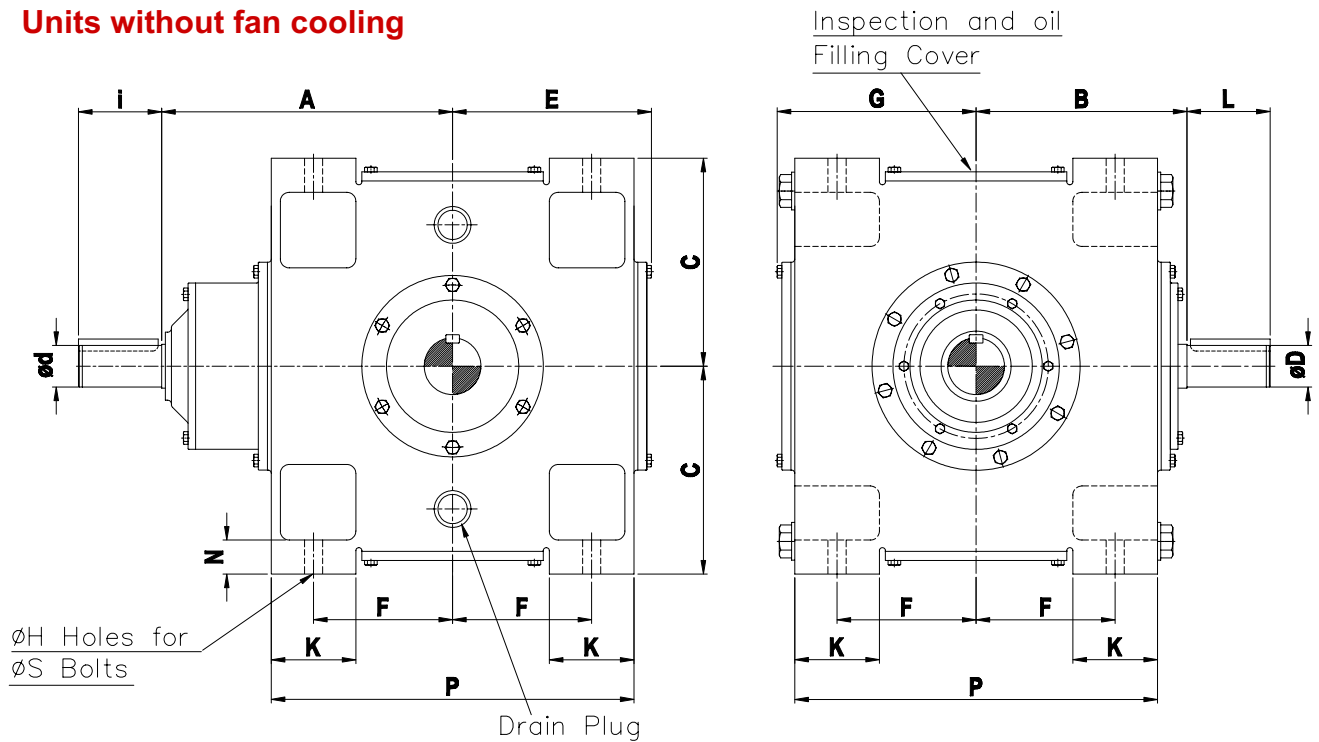


# GREAVES

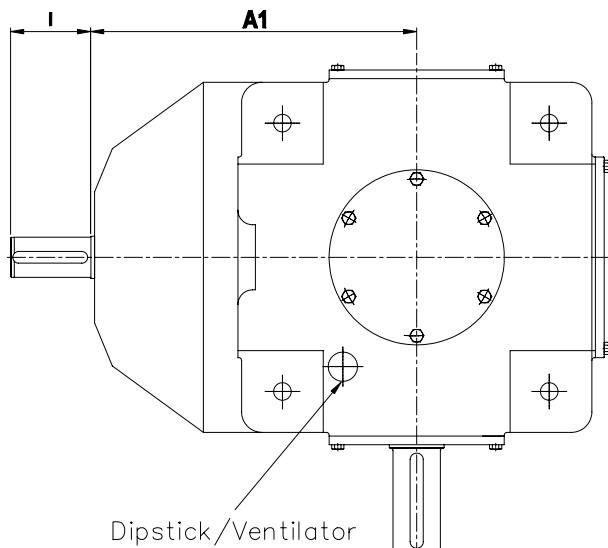
## B1-Series Right Angle Speed Reducers

Principal dimensions (mm)  
Horizontal & Vertical installation

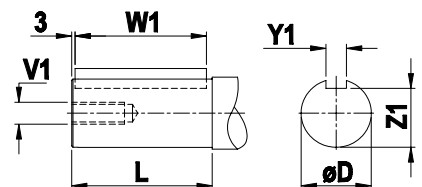
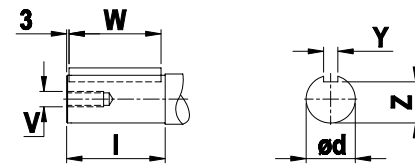
### Units without fan cooling



### Units with fan cooling



### Input Shaft



### Output Shaft

**Single Reduction**



# GREAVES

## B1-Series Right Angle Speed Reducers

*Principal dimensions (mm)  
Horizontal & Vertical installation*

Unit Size	d	I	D	L	A	A1	B	C	E	F	G	H
140	32	75	38	80	255	295	168	170	162	110	162	14
160	38	80	45	100	275	315	191	190	182	125	182	18
180	40	80	48	100	305	350	211	210	202	137.5	202	18
200	45	100	50	110	325	375	215	215	207	140	207	22
225	50	100	58	120	355	410	245	245	240	167.5	240	22
250	55	110	65	140	385	445	274	275	265	184	265	26
280	60	130	70	140	440	505	295	295	296	202.5	290	26
315	70	140	80	170	490	560	341	341	336	240	336	33
355	75	150	90	190	520	595	365	365	356	247.5	356	33
400	90	180	100	210	595	675	415	415	395	282.5	395	39
450	100	210	110	210	655	740	465	465	458	322.5	458	39

Unit Size	K	N	P	S	Y	Y1	W	W1	Z	Z1	V	V1
140	60	40	280	M12	9.985	9.985	69	74	27	33	M8X20	M16X36
160	70	41	320	M16	9.945	9.945	74	94	33	39.5	M16X36	M16X36
					9.985	13.982						
180	85	42	360	M16	9.945	13.939	74	94	35	42.5	M16X36	M16X36
					11.982	13.982						
200	90	40	370	M20	11.939	13.939	94	104	39.5	44.5	M16X36	M16X36
					13.982	13.982						
225	95	42	430	M20	13.939	15.939	94	114	44.5	52	M16X36	M16X36
					13.982	15.982						
250	115	45	480	M24	13.939	15.939	104	134	49	58	M16X36	M24X50
					15.982	17.982						
280	125	45	530	M24	15.939	17.939	124	134	53	62.5	M20X45	M24X50
					17.978	19.978						
315	130	50	610	M30	17.939	19.926	134	164	62.5	71	M24X50	M24X50
					19.978	21.978						
355	155	55	650	M30	19.926	21.926	144	184	67.5	81	M24X50	M24X50
					19.978	24.978						
400	175	69	740	M36	19.926	24.926	174	204	81	90	M24X50	M24X50
					24.978	27.978						
450	195	70	840	M36	24.926	27.926	204	204	90	100	M24X50	M30X60
					27.978	27.978						
					27.926	27.926						

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## B1-Series Right Angle Speed Reducers

### Load Classifications by Application

Table 3

Driven machine	Type of load	Driven machine	Type of load	Driven machine	Type of load
U = Uniform load					
M = Moderate shock load					
H = Heavy shock load					
T = Refer to Greaves					
* = 24 hours/days Service Factor Only					
** = Use 1.00 Service Factor					
¥ = Use 1.25 Service Factor					
ĩ = Use 1.50 Service Factor					
Agitators	U	Elevators	U	roll cases	H
pure liquids	M	bucket-uniform load	U	slab conveyor	H
liquids and solids	M	bucket-heavy load	M	small waste conveyor-belt	U
liquids-variable density		bucket-continuous	U	small waste conveyor-chain	M
Blowers	U	centrifugal discharge	U	sorting table	M
centrifugal	M	excavators	U	tipple hoist conveyor	M
lobe	U	freight	M	tipple hoist drive	M
vane		gravity discharge	U	transfer conveyors	M
Brewing and distilling		man lifts	T	transfer rolls	M
bottling machinery	U	passenge	T	tray drive	M
brew kettles-continuous duty	U	Fans	U	trimmer feed	M
cookers-continuous duty	U	centrifugal	U	waste conveyor	M
mash tubs-continuous duty	U	cooling towers	U	Machine tools	
scale hooper-frequent starts	M	induced draft	T	bending roll	M
Canfilling machines	U	forced draft	T	punch press-gear driven	H
Cane knives	M	induced draft	M	notching press-belt	
Car dumpers	H	large, mine, etc.	M	driven	T
Car pullers	M	large, industrial	M	plate planers	H
Clarifiers	U	light, small diameter	U	tapping machine	H
Classifiers	M	Feeders		other machine tools	
Clay working machinery		apron	M	main drives	M
brick press	H	belt	M	auxiliary drives	U
briquette machine	H	disc	U	Metal mills	
clay working machinery	M	reciprocating	H	draw bench carriage	M
pug mill	M	screw	M	and m main drive	
Compressors		Food industry		pinch, dryer and scrubber	
centrifugal	U	beef slicer	M	rolls reversing	T
lobe	M	cereal cooker	U	slitters	M
reciprocating		dough mixer	M	table conveyors	
multi-cylinder	M	meat grinders	M	non-reversing	
single-cylinder	H	Generators-not welding	U	group drives	M
Conveyors uniformly		Hommer mills	H	individual drives	H
loaded or fed		Hoists		reversing	T
apron	U	heavy duty	H	wire drawing and	
assembly	U	medium duty	M	flottening machine	
belt	U	skip hoist	M	wire winding machine	M
bucket	U	Laundry washers	M	Mills-rotary type	
chain	U	reversing	M	ball*	M
flight	U	Laundry tumblers	M	cement kilns*	M
oven	U	Line shafts		druers and coolers*	M
screw	U	driving processing		kilns, other than cement	M
Conveyors-heavy duty		equipment	M	pebble*	
not uniformly fed		light	U	rod*	
apron	M	other line shafts	U	plain	
assembly	M	Lumber industry		wedge bar	M
belt	M	barkers-hydraulic		tumbling barrels	M
bucket	M	mechanical	M	Mixers	
chain	M	burner conveyor	M	concrete mixers	
flight	M	chain saw and drag saw	H	continuous	
live roll	T	chain transfer	H	concrete mixers	M
oven	M	craneway transfer	H	intermittent	
reciprocating	H	de-barking drum	H	constant density	M
screw	M	edger feed	M	variable density	U
shaker	H	gang feed	M	Oil Industry	
Cranes		green chain	M	chillers	
main hoists	M	live rolls	H	oil well pumping	M
bridge travel	T	kig deck	H	paraffin press	T
trolley travel	T	log haul-incline	H	rotary kilns	M
Crusher		log haul-well type	H	Paper mills	
ore	H	log turning device	H	agitators, (mixers)	
stone	H	main log conveyor	H	barker-auxiliaries-	
sugar	M	off bearing rolls	M	hydraulic	
Dredges		planer feed chains	M	barker-mechanical	M
cable reels	M	planer floor chains	M	barker drum	H
conveyors	M	planer tilting hoist	M	beater and pulper	M
		re-saw merry-go-round	M	bleacher	U
		conveyor	M	calenders	M
				calenders-super	H
				converting machine	M
				except cutters, planters	
				conveyors	M
				xouch	U
				cutters-plates	M
				cylinders	H
				dryers	M
				felt stretcher	M
				felt whipper	H
				jordans	M
				log haul	H
				presses	M
				pulp machine reel	M
				stock chest	M
				suction roll	M
				washers and thickness	M
				winders	M
				Printing presses	T
				Pullers	
				barge haul	H
				Pumps	
				centrifugal	U
				prpportioning	M
				reciprocating	
				singlr acting 3 or	
				more cylinders	M
				double acting 2 or	
				more cylinders	M
				single acting 1 or 2	
				cylinders	T
				double acting single	
				cylinder	T
				rotary	
				gear type	U
				lobe, vane	U
				Rubber and plastics	
				industries	
				crackers*	H
				laboratory equipment	M
				mixed mills*	H
				refiners*	M
				rubber calenders*	M
				rubber mill 2 on line*	M
				sheet*	U
				tire building machines	M
				tire and tube press	
				openers	T
				tubers and strainers*	M
				warming mills*	M
				Sand muller	M
				Sewage disposal	
				equipment	
				bar screens	U
				chemical feeders	U
				collectors	U
				dewatering screws	M
				scum breakers	M
				slow or rapid mixers	M
				thickeners	M
				vacuum filters	M
				Screens	
				air washing	U
				rotary-stone or gravel	M
				travelling water intake	U
				Slab pushers	M
				Steering gear	T
				stokers	U
				sugar industry	
				cane knives	M
				crushers	M
				mills*	M
				Textile industry	
				batches	M
				calenders	M
				cards	M
				dey cans	M
				dryers	M
				dyeing machinery	M
				knitting machines	T
				looms	M
				mangles	M
				nappers	M
				pads	M
				range drives	T
				slashers	M
				soapers	M
				spinners	M
				tenter frames	M
				washers	M
				winders	M
				Windlass	T

# Single Reduction



# GREAVES

## B1-Series Right Angle Speed Reducers

*Mechanical kW rating*

*Horizontal & Vertical Installation*

Nominal Ratio	Actual Ratio	Input Rpm	Nominal Output Rpm	Unit Size										
				140	160	180	200	225	250	280	315	355	400	450
1/1	1/1	1500	1500	51	82	<b>122</b>	139	<b>207</b>	<b>280</b>	<b>385</b>	<b>538</b>	<b>732</b>	<b>1120</b>	<b>1516</b>
		1000	1000	37	59	88	100	<b>150</b>	<b>203</b>	<b>278</b>	<b>389</b>	<b>529</b>	<b>810</b>	<b>1096</b>
		750	750	29	47	69	80	119	<b>161</b>	<b>221</b>	<b>309</b>	<b>420</b>	<b>643</b>	<b>870</b>
		600	600	24	39	58	67	<b>100</b>	<b>135</b>	<b>185</b>	<b>259</b>	<b>352</b>	<b>538</b>	<b>728</b>
		500	500	21	34	51	58	<b>86</b>	<b>116</b>	<b>160</b>	<b>223</b>	<b>304</b>	<b>465</b>	<b>629</b>
1.22/1	1.218/1	1500	1230	48	77	116	129	<b>192</b>	<b>279</b>	<b>372</b>	<b>520</b>	<b>700</b>	<b>1024</b>	<b>1289</b>
		1000	820	35	55	84	93	<b>139</b>	<b>202</b>	<b>269</b>	<b>376</b>	<b>506</b>	<b>740</b>	<b>1004</b>
		750	615	28	44	67	74	110	<b>160</b>	<b>214</b>	<b>298</b>	<b>402</b>	<b>588</b>	<b>798</b>
		600	492	23	37	56	62	<b>92</b>	<b>134</b>	<b>179</b>	<b>250</b>	<b>336</b>	<b>492</b>	<b>667</b>
		500	410	20	32	48	53	<b>80</b>	<b>115</b>	<b>155</b>	<b>216</b>	<b>290</b>	<b>425</b>	<b>576</b>
1.50/1	1.517/1	1500	1000	47	75	111	123	<b>181</b>	<b>275</b>	<b>350</b>	<b>503</b>	<b>676</b>	<b>1000</b>	<b>1335</b>
		1000	666	34	54	80	89	131	<b>199</b>	<b>253</b>	<b>364</b>	<b>489</b>	<b>723</b>	<b>965</b>
		750	500	27	43	64	71	104	<b>158</b>	<b>201</b>	<b>290</b>	<b>388</b>	<b>575</b>	<b>767</b>
		600	400	22	36	53	59	87	<b>132</b>	<b>168</b>	<b>242</b>	<b>325</b>	<b>481</b>	<b>641</b>
		500	333	19	31	46	51	<b>75</b>	<b>114</b>	<b>145</b>	<b>209</b>	<b>280</b>	<b>415</b>	<b>554</b>
1.84/1	1.846/1	1500	815	44	73	105	120	<b>178</b>	<b>242</b>	<b>332</b>	<b>464</b>	<b>633</b>	<b>965</b>	<b>1300</b>
		1000	544	32	53	76	86	129	175	<b>240</b>	<b>335</b>	<b>458</b>	<b>698</b>	<b>940</b>
		750	408	25	42	60	69	102	139	<b>191</b>	<b>266</b>	<b>364</b>	<b>554</b>	<b>747</b>
		600	326	21	35	50	57	86	116	<b>160</b>	<b>223</b>	<b>304</b>	<b>464</b>	<b>624</b>
		500	272	18	30	44	50	<b>74</b>	<b>101</b>	<b>138</b>	193	<b>263</b>	<b>401</b>	<b>540</b>
2.25/1	2.250/1	1500	663	33	55	79	90	135	183	251	<b>351</b>	<b>479</b>	<b>730</b>	<b>983</b>
		1000	444	24	40	57	65	97	132	181	<b>253</b>	346	<b>572</b>	<b>711</b>
		750	333	19	32	45	52	77	105	144	201	275	<b>419</b>	564
		600	266	16	26	38	43	67	88	120	<b>168</b>	230	<b>350</b>	<b>472</b>
		500	222	14	23	33	37	56	76	104	<b>145</b>	<b>199</b>	<b>303</b>	<b>408</b>
2.76/1	2.761/1	1500	543	25	42	61	70	104	141	193	270	370	562	757
		1000	362	18	31	44	50	75	102	140	195	266	406	547
		750	272	15	24	35	40	60	81	111	155	212	322	434
		600	217	12	20	29	33	50	68	93	129	177	270	363
		500	181	10	18	25	29	43	58	80	112	153	<b>233</b>	314
3.38/1	3.388/1	1500	444	20	33	48	55	81	111	151	212	288	441	594
		1000	296	14	24	35	39	59	80	110	153	209	319	429
		750	222	11	19	27	31	46	63	87	122	166	253	341
		600	178	9	16	23	26	39	53	73	102	139	212	285
		500	148	8	14	20	23	33	45	63	88	120	183	246
4.13/1	4.125/1	1500	363	16	26	38	43	65	88	121	169	230	351	473
		1000	242	11	19	28	31	31	64	87	122	166	254	342
		750	182	9	15	22	25	37	50	69	97	132	201	272
		600	145	8	13	18	21	31	42	58	81	110	168	227
		500	121	6	11	16	18	27	36	50	70	96	146	196

Figures marked in bold red color indicate units with forced lubrication

## Single Reduction



# GREAVES

## B1-Series Right Angle Speed Reducers

*Thermal kW rating  
Horizontal & Vertical installation*

### *Units without fan*

Description	Air Flow	Unit Size										
		140	160	180	200	225	250	280	315	355	400	450
Without cooling for small confined space	>= 0.5m/s	31	37	44	48	52	71	83	110	125	158	199
Without cooling for large premises, workshops etc.	>= 1.4m/s	44	51	62	68	73	99	117	154	175	222	279
Without cooling in open space	>=3.7m/s	58	68	83	90	97	132	155	205	233	295	371

### *Units with fan*

Description	rpm	Unit Size										
		140	160	180	200	225	250	280	315	355	400	450
With fan cooling	1500	74	95	119	140	160	218	262	301	458	568	707
	1000	62	79	99	116	137	184	214	241	372	455	591
	750	52	67	84	97	119	155	184	207	319	386	570
	600	--	52	66	74	88	119	135	147	231	271	409
	500	--	44	54	60	69	99	106	112	179	204	315

### *Net weight and Oil capacity*

Type of Unit	Description	Unit Size										
		140	160	180	200	225	250	280	315	355	400	450
Horizontal & Vertical installation	Net Weight (Kg.)	85	124	145	173	225	245	295	495	625	908	1400
	Oil required at 1st filling (litres)	5	6	8	11	18	24	32	51	65	100	135

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6-2-47, A.C. Guards, 1<sup>st</sup> Floor, P.B. No. 9,  
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