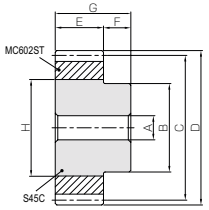
Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	10
Hub width (F)	10
Total length (G)	20
Screw offset (J)	5

* The precision grade of J Series products is equivalent to the value shown in the table.



S1

Catalog No.	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Metal core dia. H	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (kg)
NSU1-30	30	S1	8	20	30	32	20	1.23	0.13	0~0.34	0.046
NSU1-32	32			22	32	34	22	1.34	0.14		0.057
NSU1-34	34			25	34	36	25	1.44	0.15		0.074
NSU1-35	35			25	35	37	25	1.50	0.15		0.075
NSU1-36	36			25	36	38	25	1.56	0.16		0.076
NSU1-40	40		10	25	40	42	28	1.78	0.18		0.082
NSU1-45	45			30	45	47	34	2.06	0.21		0.12
NSU1-48	48			30	48	50	34	2.23	0.23		0.13
NSU1-50	50			30	50	52	34	2.35	0.24		0.13
NSU1-60	60			40	60	62	45	2.93	0.30	0~0.36	0.23
NSU1-70	70		40		70	72	45	3.46	0.35		0.24
NSU1-80	80				80	82	45	4.00	0.41		0.25
NSU1-90	90				90	92	55	4.56	0.46		0.32
NSU1-100	100				100	102	65	5.12	0.52		0.40

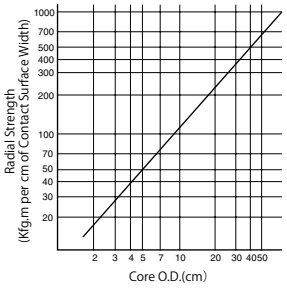
[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), teeth diameter and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ When the core O.D is the same as the hub diameter, you may see some serration on the hub. There is no effect on the strength of the gear.
④ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
⑤ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Even though the holding strength at the material interface is designed to be stronger than the teeth, a secondary operation may weaken the holding strength.
③ Plastic gears are susceptible to the effects of temperature and moisture. Dimensional changes may occur while performing secondary operations and during post-machining operations.

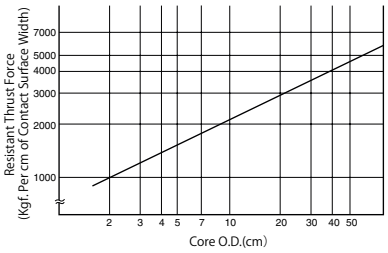
■ Definition of Holding Strength and Safety Factor

① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

■ Relationship between radial strength and core diameter



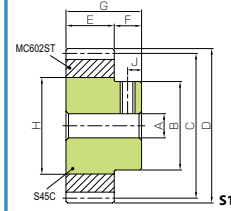
■ Relationship between resistant thrust force and core diameter



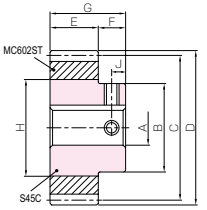
J Series

Plastic Spur Gears with Steel Core

Newly added



S1T



S1K

To order J Series products, please specify; Catalog No. + J + BORE

Bore H7	* The product shapes of J Series items are identified by background color.													
Keyway Js9	8	10	12	14	15	16	17	18	19	20	22	25	28	30
Screw size	—	5 × 2.3						6 × 2.8				8 × 3.3		
Catalog No.	M5	M4						M5				M6		
NSU1-30 J BORE														
NSU1-32 J BORE														
NSU1-34 J BORE														
NSU1-35 J BORE														
NSU1-36 J BORE														
NSU1-40 J BORE														
NSU1-45 J BORE														
NSU1-48 J BORE														
NSU1-50 J BORE														
NSU1-60 J BORE														
NSU1-70 J BORE														
NSU1-80 J BORE														
NSU1-90 J BORE														
NSU1-100 J BORE														

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① As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.

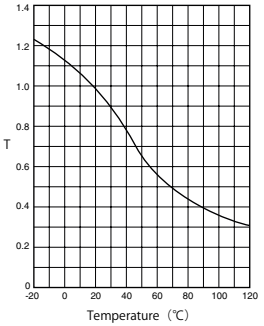
② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where
Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
T : Temperature Compensation Factor

* Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor T

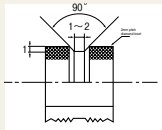


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.



② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
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Elimination of bolts and nuts provides a cleaner physical appearance.

Plastic Spur Gears with Steel Core

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Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	15
Hub width (F)	12
Total length (G)	27
Screw offset (J)	6

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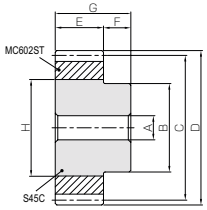

S1

Catalog No.	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Metal core dia. H	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (kg)
NSU1.5-28	28	S1	10	30	42	45	30	3.82	0.39	0~0.38	0.15
NSU1.5-30	30				45	48	30	4.15	0.42		0.15
NSU1.5-32	32			33	48	51	33	4.51	0.46		0.18
NSU1.5-34	34				51	54	33	4.88	0.50	0~0.40	0.19
NSU1.5-35	35				52.5	55.5	36	5.07	0.52		0.20
NSU1.5-36	36				54	57	36	5.26	0.54		0.21
NSU1.5-40	40			40	60	63	45	6.00	0.61		0.31
NSU1.5-45	45				67.5	70.5	45	6.94	0.71		0.33
NSU1.5-48	48				72	75	45	7.53	0.77		0.33
NSU1.5-50	50		12		75	78	45	7.92	0.81		0.33
NSU1.5-56	56			50	84	87	55	9.09	0.93		0.50
NSU1.5-60	60				90	93	55	9.89	1.01		0.51
NSU1.5-68	68				102	105	67	11.3	1.15		0.66
NSU1.5-70	70				105	108	70	11.7	1.19	0~0.42	0.70
NSU1.5-80	80			60	120	123	85	13.5	1.38		1.01
NSU1.5-90	90				135	138	100	15.4	1.57		1.29

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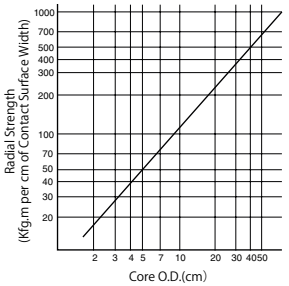

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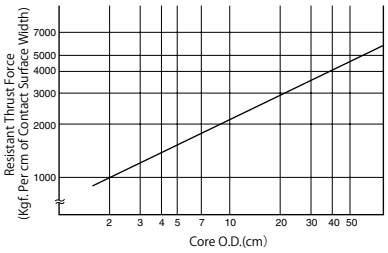
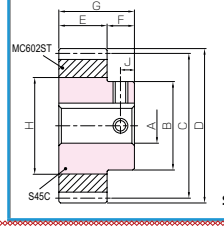


J Series

Plastic Spur Gears with Steel Core

Newly added



S1K

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Bore H7	* The product shapes of J Series items are identified by background color.														
Keyway Js9	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35
Screw size	5 × 2.3						6 × 2.8				8 × 3.3			10 × 3.3	
Catalog No.	M4						M5				M6			M8	
NSU1.5-28 J BORE															
NSU1.5-30 J BORE															
NSU1.5-32 J BORE															
NSU1.5-34 J BORE															
NSU1.5-35 J BORE															
NSU1.5-36 J BORE															
NSU1.5-40 J BORE															
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NSU1.5-56 J BORE															
NSU1.5-60 J BORE															
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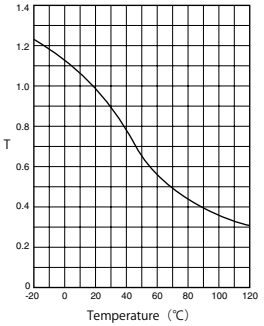

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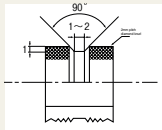

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Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	20
Hub width (F)	14
Total length (G)	34
Screw offset (J)	7

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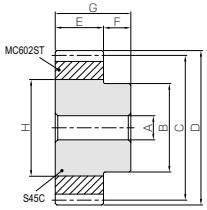

S1

Catalog No.	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Metal core dia. H	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (kg)
NSU2-20	20	S1	10	22	40	44	22	5.89	0.60	0~0.42	0.10
NSU2-22	22			30	44	48	30	6.66	0.68		0.19
NSU2-24	24				48	52	30	7.43	0.76		0.19
NSU2-25	25				50	54	30	7.85	0.80		0.20
NSU2-28	28			35	56	60	35	9.05	0.92	0~0.44	0.27
NSU2-30	30		12	40	60	64	35	9.84	1.00		0.28
NSU2-32	32				64	68	40	10.7	1.09		0.35
NSU2-34	34				68	72	45	11.6	1.18		0.41
NSU2-35	35				70	74	45	12.0	1.22		0.41
NSU2-36	36				72	76	45	12.5	1.27		0.42
NSU2-40	40		15	55	80	84	60	14.2	1.45		0.71
NSU2-44	44				88	92	60	16.0	1.63		0.74
NSU2-45	45				90	94	60	16.5	1.68		0.74
NSU2-48	48			60	96	100	65	17.8	1.82		0.88
NSU2-50	50				100	104	65	18.8	1.92		0.90
NSU2-56	56				112	116	65	21.5	2.20	0~0.46	0.95
NSU2-60	60				120	124	85	23.5	2.39		1.29
NSU2-68	68				136	140	100	26.8	2.74		1.66
NSU2-70	70				140	144	105	27.7	2.82		1.79
NSU2-80	80				160	164	125	32.0	3.27		2.38

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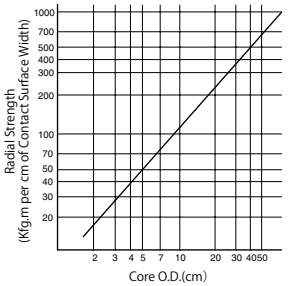

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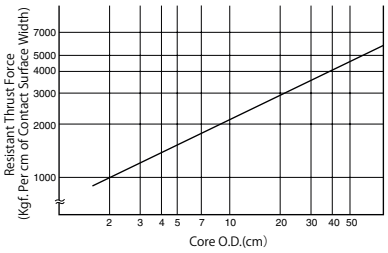

J Series

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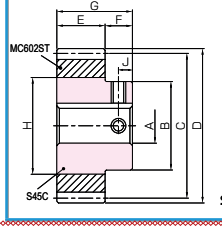

S1K

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Bore H7	* The product shapes of J Series items are identified by background color.														
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Screw size	5 × 2.3						6 × 2.8				8 × 3.3			10 × 3.3	
Catalog No.	M4						M5				M6			M8	
NSU2-20 J BORE															
NSU2-22 J BORE															
NSU2-24 J BORE															
NSU2-25 J BORE															
NSU2-28 J BORE															
NSU2-30 J BORE															
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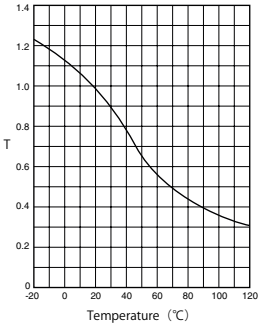
■ Ambient temperature compensation factor T



■ How is MC nylon fused to the metal core

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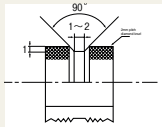

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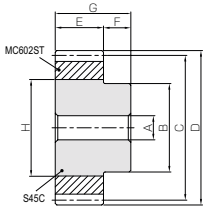
Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	25
Hub width (F)	15
Total length (G)	40
Screw offset (J)	7.5

* The precision grade of J Series products is equivalent to the value shown in the table.



S1

Catalog No.	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Metal core dia. H	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (kg)
NSU2.5-18	18	S1	12	25	45	50	25	9.93	1.01	0~0.44	0.15
NSU2.5-20	20			28	50	55	28	11.5	1.17		0.20
NSU2.5-22	22			35	55	60	35	13.0	1.33	0~0.46	0.31
NSU2.5-24	24			35	60	65	35	14.5	1.48		0.32
NSU2.5-25	25			35	62.5	67.5	35	15.3	1.56		0.33
NSU2.5-28	28			40	70	75	40	17.7	1.80		0.44
NSU2.5-30	30			45	75	80	50	19.2	1.96		0.61
NSU2.5-32	32			45	80	85	50	20.9	2.13		0.63
NSU2.5-34	34			50	85	90	55	22.6	2.30		0.76
NSU2.5-35	35			55	87.5	92.5	60	23.5	2.39		0.90
NSU2.5-36	36		15	55	90	95	60	24.3	2.48	0~0.48	0.91
NSU2.5-40	40			65	100	105	70	27.8	2.83		1.21
NSU2.5-44	44			65	110	115	75	31.3	3.19		1.36
NSU2.5-45	45			65	112.5	117.5	75	32.1	3.28		1.37
NSU2.5-48	48			65	120	125	85	34.8	3.55		1.62
NSU2.5-50	50		20	65	125	130	95	36.7	3.74		1.89
NSU2.5-56	56			65	140	145	105	42.1	4.29		2.24
NSU2.5-60	60			70	150	155	115	45.8	4.67		2.62
NSU2.5-68	68			70	170	175	135	52.4	5.34		3.42
NSU2.5-70	70			70	175	180	140	54.1	5.51		3.64

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), teeth diameter and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ When the core O.D is the same as the hub diameter, you may see some serration on the hub. There is no effect on the strength of the gear.
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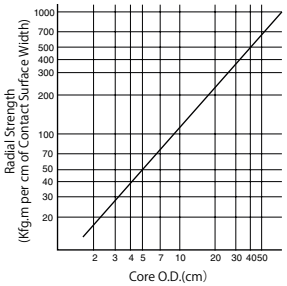
① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

■ Relationship between radial strength and core diameter



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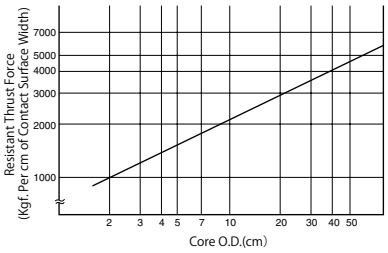
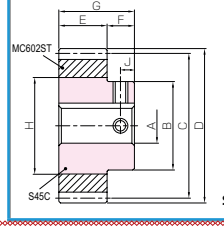


J Series

Plastic Spur Gears with Steel Core

Newly added



S1K

To order J Series products, please specify; Catalog No. + J + BORE

Bore H7	* The product shapes of J Series items are identified by background color.														
Keyway Js9	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40
Screw size	5 × 2.3					6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3
Catalog No.	M4					M5				M6			M8		
NSU2.5-18 J BORE															
NSU2.5-20 J BORE															
NSU2.5-22 J BORE															
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③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
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② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where
Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
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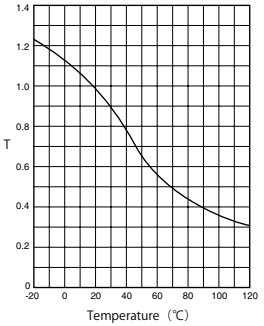

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This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

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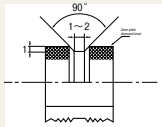

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Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	30
Hub width (F)	17
Total length (G)	47
Screw offset (J)	8.5

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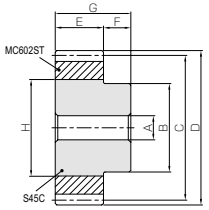

S1

Catalog No.	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Metal core dia. H	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (kg)
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NSU3-18	18			30	54	60	30	17.2	1.75	0~0.54	0.28
NSU3-20	20			33	60	66	33	19.9	2.03		0.35
NSU3-22	22			38	66	72	38	22.5	2.29		0.46
NSU3-24	24			43	72	78	43	25.1	2.56		0.59
NSU3-25	25		15	45	75	81	45	26.5	2.70		0.65
NSU3-28	28			50	84	90	50	30.5	3.11		0.79
NSU3-30	30			55	90	96	60	33.2	3.39		1.05
NSU3-32	32			60	96	102	65	36.1	3.68		1.24
NSU3-34	34			60	102	108	65	39.0	3.98	0~0.56	1.27
NSU3-35	35		20	60	105	111	75	40.5	4.13		1.51
NSU3-36	36			60	108	114	80	42.1	4.29		1.65
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NSU3-45	45			70	135	141	105	55.5	5.66		2.65
NSU3-48	48			70	144	150	105	60.2	6.14		2.72
NSU3-50	50				150	156	105	63.4	6.46		2.77
NSU3-56	56				168	174	130	72.7	7.42		3.85
NSU3-60	60				180	186	145	79.1	8.07		4.62
NSU3-68	68				204	210	165	90.6	9.23		5.85
NSU3-70	70				210	216	175	93.4	9.53		6.45

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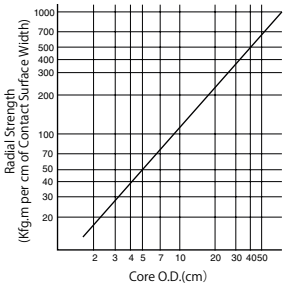

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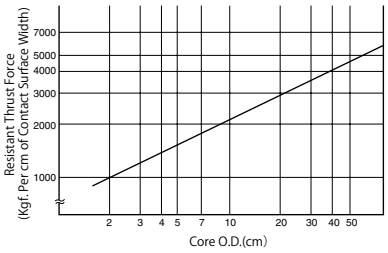

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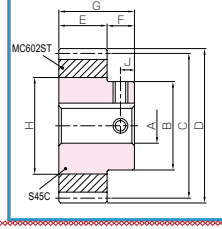

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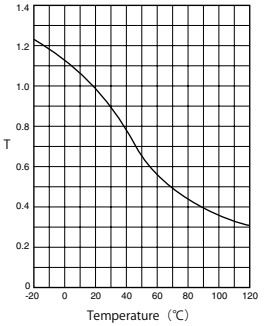

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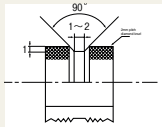

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