SCK

Shock Absorber, Adjustable Type

Related Components

Overview

Absorbs impact force with a unique mechanism. Adjustable shock absorber that extends the life of facilities/equipment and enhances production efficiency. Compared to NCK, shock absorber SCK is an optimal shock absorbing device for stopping workpieces that move at high speed or free fall.

Features

Safely stops moving objects. Increases manufacturing cycle. Extends the life of machinery. Improves the environment of machinery and prevents noise. Prevents machine breakdowns.

CONTENTS

SCK Series

● Max Absorbed Energy: 0.049 to 588 J

RoHS

Model Number Notation

SCK – **00** – **0.3** – **N1**

- Model No.
- ❶ Mounting type
- ❷ Series (Max Absorption Energy)
- ❸ Option

❶ Mounting type

Code	Content	
00	Basic type	
FA	Flange Type	

❷ Series (Max Absorption Energy)

Code	Content	Code	Content
0.005	0.049J	12	118J
0.01	0.098J	20	196J
0.03	0.294J	30	294J
0.3	2.94J	40	392J
0.6	5.88J	60	588J
1.2	11.8J	0.25M	3.43J
2.6	25.5J	0.5M	11.8J
6.5	63.7J	1.0M	74.5J
8	78.4J		

❸ Option

Code	Content	
Blank	Standard	
N1	With Stop Nut	

Accessory Parts Model No. Notation Method

● Flange bracket (1 pc.)

SCK – **0.01** – **FA**
❷

● Stop nut + Hexagon Nut (each 1 pc.)

SCK – **0.01** – **N1**
❷

● Hexagon Nut (1 pc.)

SCK – **0.01** – **NT**
❷

Specifications

Item	SCK																
Series	0.005	0.01	0.03	0.3	0.6	1.2	2.6	6.5	8	12	20	30	40	60	0.25M	0.5M	1.0M
Model / Classification	Without Adjuster Spring Return Type			Adjustable spring return type											Adjustable spring return type (Large thread pitch)		
Maximum absorption energy J	0.049	0.098	0.294	2.94	5.88	11.8	25.5	63.7	78.4	118	196	294	392	588	3.43	11.8	74.5
Outer diameter thread size mm	M10×1.0	M12×1.0	M16×1.0	M20×1.0		M25×1.5		M30×1.5		M40×1.5				M45×1.5	M14×1.5	M20×1.5	M27×3.0
Stroke mm	7	10		10		15		25		40	60		70		10	15	30
Max Absorption Energy per Hour kJ/hour	0.135	0.27	0.98	8.1	10.8	21.6	39	78	86.4		108	126	120	144	9.2	21.2	80.5
Max Impact Speed m/s	1.0			1.5	2.0		2.5			3.0			4.0		1.0	2.0	2.5
Max Repetition Frequency cycles/min	45			30		25	20	18	12	9	7		5	4	45	30	18
Ambient Temperature °C	-10 to 80 (provided there is no freezing)																
Max Load (Resistance Force Value) N	39	59	147	540	1000	1400	3100	4600	5700	8600	9000		10000	15000	630	1440	4560
Return Time s	0.3 or less			0.4 or less			0.5 or less			0.6 or less					0.4 or less		0.5 or less
Weight kg	0.02	0.04	0.07	0.2		0.32		0.63		1.17	1.25	1.39	1.45	2.05	0.05	0.13	0.39
Return Spring Force — At Extension N	1.2	2.0	5.9	5.9		6.9		12.0		20.0					29.0	3.9	5.5	7.6
Return Spring Force — At Compression N	2.6	5.0	10.5	11.3		17.2		30.0		39.0	51.0	68.0	75.0		84.0	8.4	11.5	21.0

Note: Use with a minimum absorption energy of 1/5 or more of the maximum absorption energy.
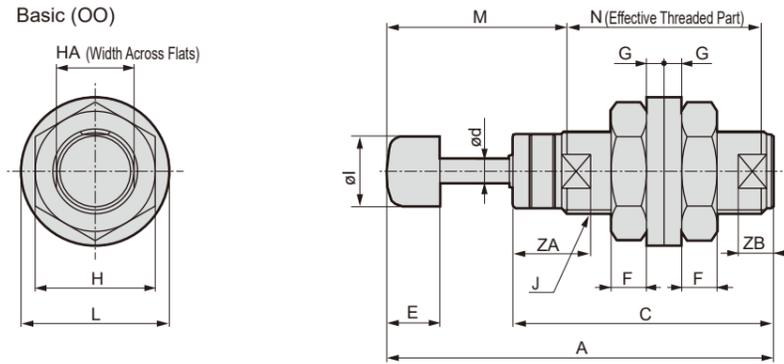
Shock Absorber and Other

As shown in the right figure
● The spring accumulates energy and functions as spring return force at the stroke end.
● Cylinder cushion (single orifice connected to hydraulic cylinder) increases resistance sharply at collision and does not decelerate smoothly.
● Shock absorbers without adjuster have a preset level of energy that is absorbed and so working conditions are limited (SCK-00-0.03 or below).
● Shock absorbers with adjuster have roughly constant resistance throughout the stroke, uniformly decelerating the object's speed. Adjustment allows the curve to move parallelly up and down, enabling absorption of impact energy without excess or deficiency.

Resistance Force / Stroke
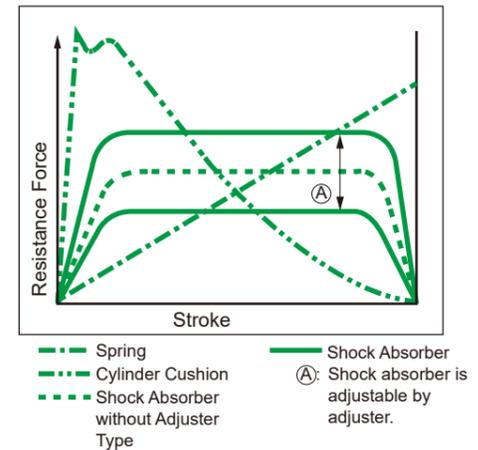
- – ・ – Spring
- – ・・ – Cylinder Cushion
- – – – Shock Absorber without Adjuster Type
- —— Shock Absorber
- Ⓐ: Shock absorber is adjustable by adjuster.

SKL
NCK
SCK
FCK
FJ
FK

Related Equipment
Cylinder Switch
Ending

1404 CKD

CKD 1405

Dimensional Drawings

● SCK-00-0.005
　　　　　0.01
　　　　　0.03

Basic (OO)

HA (Width Across Flats)

M　N (Effective Threaded Part)

Code	Basic (OO)													
Model No.	A	C	E	F	G	H	I	J	L	M	N	d	HA	ZA	ZB
SCK-00-0.005	41.5	27	7	4	2	14	8	M10×1.0	18	21.3	18.5	3.0	9	9	4
SCK-00-0.01	55	37	7.5	5	2.5	17	10	M12×1.0	21	25.5	27.5	3.5	11	11	5
SCK-00-0.03	70	49.5	10	6.5	2.5	22	14	M16×1.0	27	28.3	39.5	4.0	15	12	6

● SCK-00-0.3 to 60, 0.25M to 1.0M
　　(Screw pitch Large)

Basic (OO)

HA (Width Across Flats)

M　N (Effective Threaded Part)
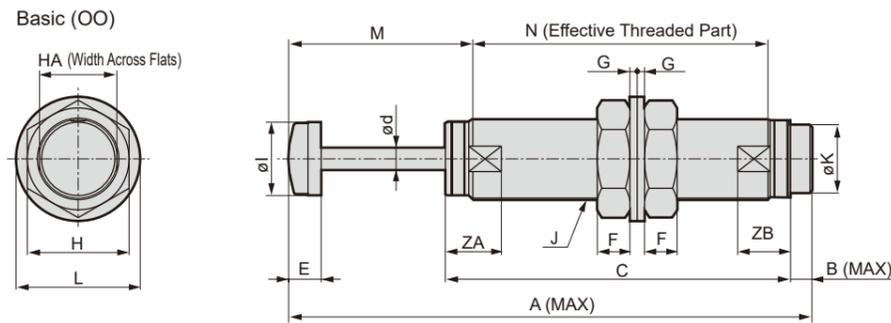
Code	Basic (OO)															
Model No.	A	B	C	E	F	G	H	I	J	K	L	M	N	d	HA	ZA	ZB
SCK-00-0.3	94.6	5.8	66.8	11	8	2.9	27	16	M20×1.0	13.5	33	33.5	45.7	5	17	17.5	16
SCK-00-0.6	94.6	5.8	66.8	11	8	2.9	27	16	M20×1.0	13.5	33	33.5	45.7	5	17	17.5	16
SCK-00-1.2	122.5	7.5	86	13	10	2.9	32	22	M25x1.5	19.5	39	40.5	65.4	6	24	21	18
SCK-00-2.6	122.5	7.5	86	13	10	2.9	32	22	M25x1.5	19.5	39	40.5	65.4	6	24	21	18
SCK-00-6.5	157.4	7.9	109.5	14	12	3.6	41	27	M30×1.5	23.5	50	51.5	89.4	8	27	21.5	19.5
SCK-00-8	157.4	7.9	109.5	14	12	3.6	41	27	M30×1.5	23.5	50	51.5	89.4	8	27	21.5	19.5
SCK-00-12	175.6	10.5	123.1	16	16	3.6	50	36	M40x1.5	33.5	61	55.5	98.5	11	38	27.5	26
SCK-00-20	205.6	10.5	138.1	16	16	3.6	50	36	M40x1.5	33.5	61	70.5	113.5	11	38	27.5	26
SCK-00-30	257.1	10.5	169.6	16	16	3.6	50	36	M40x1.5	33.5	61	90.5	145	11	38	27.5	26
SCK-00-40	277.1	10.5	179.6	16	16	3.6	50	36	M40x1.5	33.5	61	100.5	155	11	38	27.5	26
SCK-00-60	298.4	10.9	198.6	18	18	4.5	55	42	M45x1.5	37.5	67	102.9	172.5	12.5	43.5	31.5	30
SCK-00-0.25M	96.6	6.5	69.1	10	5.5	2.5	19	12	M14×1.5	10	24	26.1	53.5	4	12.4	10	15.5
SCK-00-0.5M	111.4	6.5	77.9	11	8	2.9	27	16	M20x1.5	13.5	33	33	60.8	5	17	12	17.5
SCK-00-1.0M	161.6	7.7	109.9	13	10	2.9	32	22	M27×3.0	19.5	39	50.5	90.3	6	24	15	22

Dimensional Drawings with Option

Flange (Mounting Bracket) Stop Nut

● SCK-0.005-□□
　　　0.01
　　　0.03

Flange (FA)
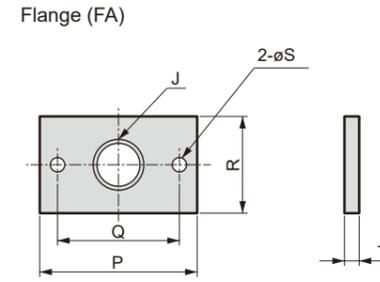
Stop Nut (N1)

● SCK-0.3 to 60, 0.25M to 1.0M-□□
　　(Screw pitch: Large)

Flange (FA)
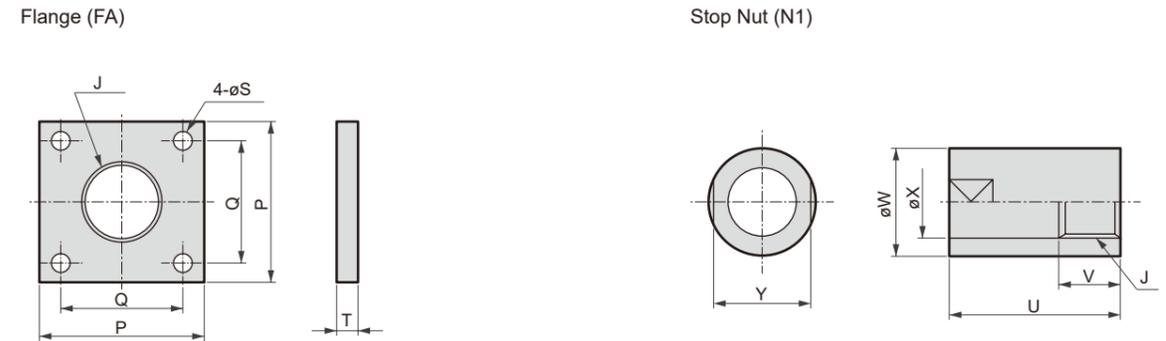
Stop Nut (N1)

Code	Flange (FA)					Weight	Stop Nut (N1)						Weight
Model No.	J	P	Q	R	S	T	(g)	J	U	V	W	X	Y	(g)
SCK-0.005-□□	M10×1.0	42	30	20	5.5	2.3	14	M10×1.0	17	10	15	11	13	12
SCK-0.01-□□	M12×1.0	46	34	20	5.5	3.6	22	M12×1.0	23	10	19	13	17	19
SCK-0.03-□□	M16×1.0	52	40	32	5.5	4.5	51	M16×1.0	23	10	22	17	19	30
SCK-0.3-□□	M20×1.0	52	38	-	6.5	6	107	M20×1.0	32.5	15	26	21	24	52
SCK-0.6-□□	M20×1.0	52	38	-	6.5	6	107	M20×1.0	32.5	15	26	21	24	52
SCK-1.2-□□	M25x1.5	52	38	-	6.5	6	100	M25x1.5	35	15	32	26	30	82
SCK-2.6-□□	M25x1.5	52	38	-	6.5	6	100	M25x1.5	35	15	32	26	30	82
SCK-6.5-□□	M30×1.5	66	48	-	8.5	6	163	M30×1.5	40	15	40	31	36	162
SCK-8-□□	M30×1.5	66	48	-	8.5	6	163	M30×1.5	40	15	40	31	36	162
SCK-12-□□	M40x1.5	84	64	-	10.5	9	390	M40x1.5	69.5	20	50	41	46	362
SCK-20-□□	M40x1.5	84	64	-	10.5	9	390	M40x1.5	69.5	20	50	41	46	362
SCK-30-□□	M40x1.5	84	64	-	10.5	9	390	M40x1.5	69.5	20	50	41	46	362
SCK-40-□□	M40x1.5	84	64	-	10.5	9	390	M40x1.5	69.5	20	50	41	46	362
SCK-60-□□	M45×1.5	84	64	-	10.5	9	390	M45×1.5	70	20	60	46	55	649
SCK-0.25M-□□	M14×1.5	52	38	-	6.5	6	115	M14×1.5	26.5	10	20	15	17	30
SCK-0.5M-□□	M20×1.5	52	38	-	6.5	6	108	M20×1.5	36.5	15	26	21	24	59
SCK-1.0M-□□	M27×3.0	52	38	-	6.5	6	106	M27×3.0	45.5	15	35	28	32	134

Related Equipment

SKL
NCK
SCK
FCK
FJ
FK

Cylinder Switch

Ending

Internal Structure Drawing and Operating Explanation

●SCK-00-0.005
  00-0.01
  00-0.03

At Impact

Damper Case
Orifice
Air Chamber
Damper
Piston Rod
Spring
Cylinder
Slit Valve

Do not disassemble

At Return

●SCK-00-0.3 to 60

At Impact

Orifice
Cylinder
Piston Rod
Air Chamber
Damper Case
Balance valve
Adjuster
Damper
Spring
Adjuster Pin
Detent Mechanism

Do not disassemble

At Return

Check Valve
Spring

At Impact

The impact force applied to the damper pushes the Piston Rod, pressurizes the oil in the cylinder, and the generated hydraulic pressure absorbs the shock when flowing into the damper case via the orifice. The oil flowing into the damper case pressurizes the air chamber, reducing the volume of the air chamber itself.

Note) This product is structured so that internal pressure increases due to workpiece speed at impact, generating resistance force and absorbing energy. Therefore, although the resistance force may feel low when pushed with fingers, there is no abnormality in the product.

At Return

When the impacted workpiece is gone, the Piston Rod extends due to the built-in spring, and simultaneously, the slit valve (check valve) opens due to the pressure in the air chamber. When oil finishes flowing into the inner pipe, the slit valve closes.
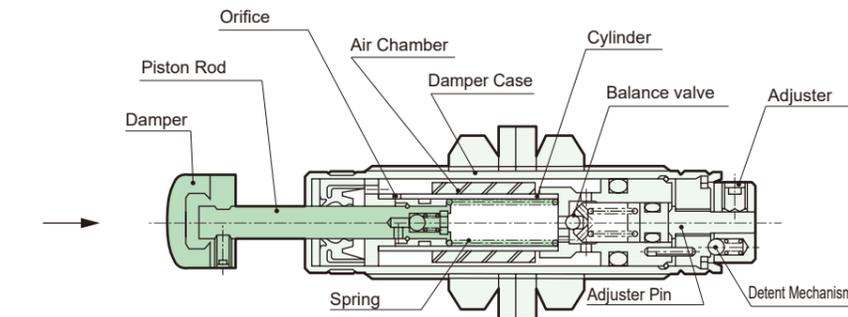
At Impact

The impact force applied to the damper pushes the piston via the Piston Rod, pressurizes the oil in the cylinder, and the generated hydraulic pressure absorbs the shock when flowing into the damper case via the orifice and balance valve. Turning the adjuster clockwise moves the adjust pin, strengthens the balance valve spring, reduces oil flow, and withstands large impact forces.

Note) This product is structured so that internal pressure increases due to workpiece speed at impact, generating resistance force and absorbing energy. Therefore, although the resistance force may feel low when pushed with fingers, there is no abnormality in the product.
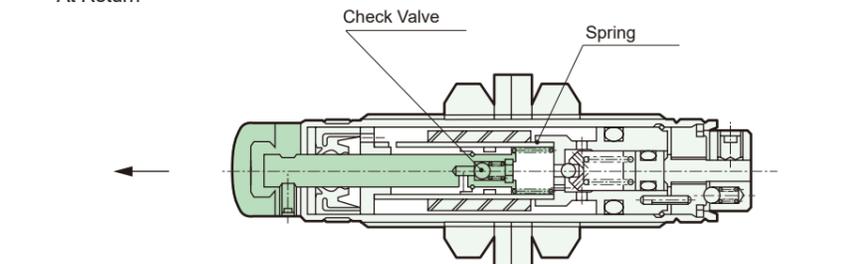
At Return

When the impacted workpiece is gone, the Piston Rod extends due to the built-in spring, and simultaneously, the check valve opens due to the pressure in the air chamber. When oil finishes flowing into the inner pipe, the check valve closes.

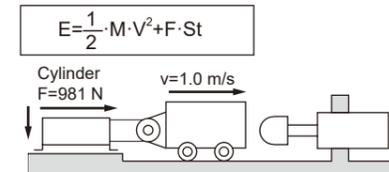## Model selection guide

Setting of Operating Conditions

When selecting a shock absorber, please clarify the following operating conditions.
① Payload (kg)
② Impact speed at the moment of hitting the shock absorber (m/s)
③ If there is an external force applied to the load, its thrust (kgf)

Code
D = Cylinder Diameter (mm)
E = Kinetic Energy (J)
P = Operating Pressure (MPa)
K = Radius of Gyration (m)(Distance from load center to center of rotation)
ω = Impact Angular Velocity (rad/s)
I = Moment of Inertia (kg·m^2)
F = Thrust (N)
T = Torque (N·m)
V = Impact Speed (m/s)
H = Height (m)
St = Shock Absorber Stroke (m)
M = Workpiece Weight (kg)
g = Gravitational Acceleration 9.8 m/s^2

Calculation Example

① Vertical Fall Motion (Free Fall)

$$E=\frac{1}{2}\cdot M\cdot V^2+Mg\cdot St$$

M=70 kg
H = 0.7 m
ST

When a workpiece with weight (M) of 70 kg undergoes vertical fall motion from a height (H) of 0.7 m, consider if SCK-00-60 can be used.

Determine the Max impact speed under these conditions.

$$V=\sqrt{2\cdot g\cdot H}=\sqrt{19.6\times H}$$

$$V=\sqrt{19.6\times 0.7}=3.7 \text{ m/s} < 4 \text{ m/s}$$

(SCK-00-60)

$$E=\frac{1}{2}\times 70\times 3.7^2+70\times 9.8\times 0.07=527.2$$

From the impact speed characteristic graph of absorption energy amount in Graph 1, the absorption energy of SCK-00-60 is larger. Therefore, energy can be absorbed by SCK-00-60.

② Horizontal Motion (Inertial Motion)

$$E=\frac{1}{2}\cdot M\cdot V^2$$

V=1.0 m/s
M=10 kg

When a workpiece with weight (M) of 10 kg has an impact speed (V) of 1.0 m/s,

$$E=\frac{1}{2}\times 10\times (1.0)^2=5.0 \text{ J}$$

SCK-00-1.2 can be used.

③ Horizontal Motion (With Thrust)

$$E=\frac{1}{2}\cdot M\cdot V^2+F\cdot St$$

Cylinder
F=981 N
v=1.0 m/s

When moving the workpiece from calculation ② with a pneumatic cylinder (D)ø50 mm at air pressure (P) 0.5 MPa, the pneumatic cylinder thrust is
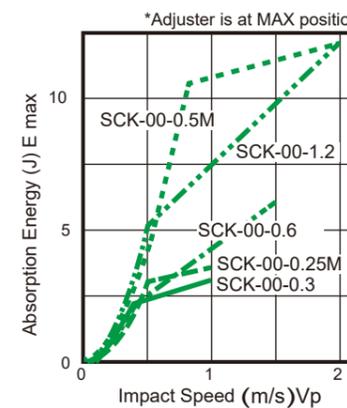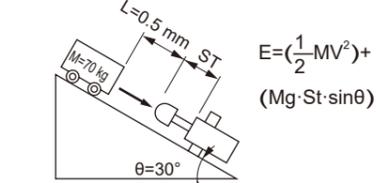
$$F=\frac{\pi}{4}\times D^2\times P=\frac{\pi}{4}\times 50^2\times 0.5=981 \text{ N}$$

Consider if SCK-00-6.5 can be used.

$$E=\frac{1}{2}\times 10\times (1.0)^2+981\times 0.025$$
$$\approx 29.5$$

Therefore, energy can be absorbed with SCK-00-6.5.

(Graph 1)

④ Inclined Fall Motion

L=0.5 mm
ST
M=70 kg
θ=30°

$$E=(\frac{1}{2}MV^2)+(Mg\cdot St\cdot sin\theta)$$

When a workpiece weighing 70 kgf undergoes inclined fall motion at 30°, consider if SCK-00-40 can be used. Determining the Max impact speed under the same conditions

$$V=\sqrt{19.6\times H(H=0.5\times sin30°)}$$
$$=\sqrt{19.6\times 0.5\times sin30°}$$
$$= 2.2 \text{ m/s} < 3 \text{ m/s}$$
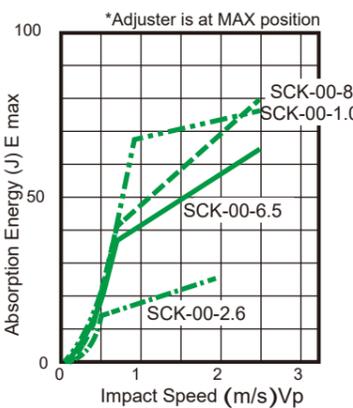
$$E=(\frac{1}{2}\times 70\times 2.2^2)+(70\times 9.8\times 0.07\times sin30°)$$
$$\approx 193.4 \text{ J}$$

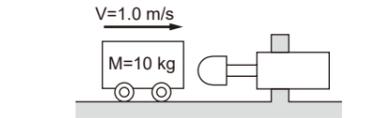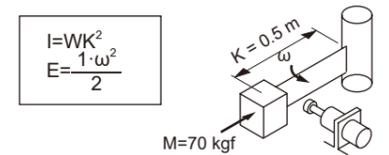Therefore, energy can be absorbed with SCK-00-20.

⑤ Horizontal Rotational Motion (Inertial Motion)

$$I=WK^2$$
$$E=\frac{I\cdot \omega^2}{2}$$
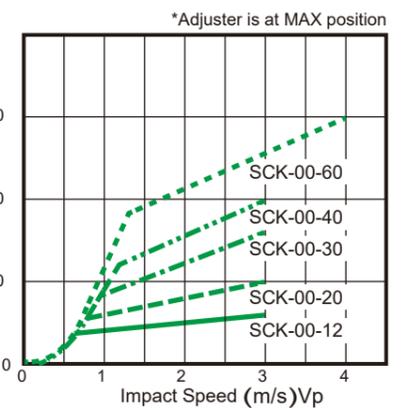
K = 0.5 m
ω
M=70 kgf

When a workpiece weighing 70 kgf is operating with a radius of gyration (K) of 0.5 m and an impact angular velocity of 1 rad/s, consider if SCK-00-1.2 can be used.

$$I=70\times (0.5)^2=17.5 \text{ kg·m}^2$$
$$E=\frac{(1)^2}{2}=\frac{17.5\times (1)^2}{2}$$
$$= 8.8 \text{ J}$$

Therefore, energy can be absorbed with SCK-00-1.2.

Vp·Emax Characteristics (Impact Speed/Absorption Energy)

*Adjuster is at MAX position

SCK-00-0.5M
SCK-00-1.2
SCK-00-0.6
SCK-00-0.25M
SCK-00-0.3

Absorption Energy (J) E max
Impact Speed (m/s)Vp

*Adjuster is at MAX position

SCK-00-8
SCK-00-1.0M
SCK-00-6.5
SCK-00-2.6

Absorption Energy (J) E max
Impact Speed (m/s)Vp

*Adjuster is at MAX position

SCK-00-60
SCK-00-40
SCK-00-30
SCK-00-20
SCK-00-12

Absorption Energy (J) E max
Impact Speed (m/s)Vp

*At low speed, absorption energy decreases, so please be careful.