



Dyna Shock System

# **D2S SPRINGS for AUTOMATIC WORK ROLL CHOCK SEPARATION**

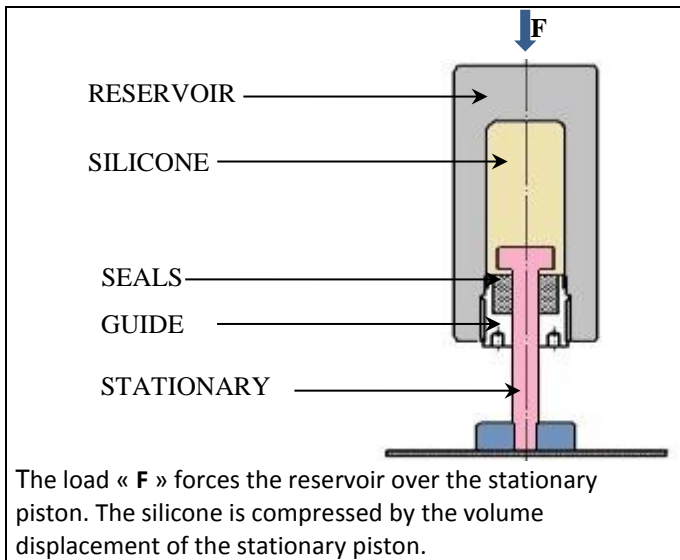


### Introduction:

**D2S** devices are designed and built on the principle of the compression and the shear characteristics of specially formulated silicone compounds.

These characteristics enable the **D2S** device to be designed as an energy storing device (a spring) or an energy dissipating device (a shock absorber) or a combination of both by modifying the geometry of the unit and selecting an appropriate silicone compound, emphasis can be placed either on the energy storing function or on the energy dissipated function.

## OPERATING CONDITIONS OF THE D2S SPRING



### Advantages:

- 1- Extremely compact.
- 2- Dependable retention of initial characteristics, even after years of non-use.
- 3- Easy installation.
- 4- No maintenance.
- 5- No adjustment necessary in service.
- 6- Elimination of complementary devices for pre-loading, this being obtained directly by pre-stressing the silicone during initial charging.
- 7- Appreciable service life: in normal operating conditions it may reach 5 to 10 years.

## D2S SPRING FOR AUTOMATIC WORK ROLL CHOCK SEPARATION

The weight of the top work rolls and chock assembly is supported on two or four **D2S** springs. The units are pre-stressed to a load approximately 10% higher than the weight of the top roll assembly.

Consequently, when the top roll assembly is resting on the springs, there is no movement or compression. When the top back-up roll is forced down on the top work roll to the desired roll gap, the **D2S** units are compressed and remain in the compressed position during the rolling operation.

When the top back-up roll is removed the **D2S** units force the top work roll and chock assembly upwards to their fully extended position maintaining the two work rolls at a constant centre to centre distance.

The **D2S** Spring is located in a vertical cavity in the bottom work roll chock, with the piston facing down, resting on the bottom of the cavity or on a replaceable thrust plate.

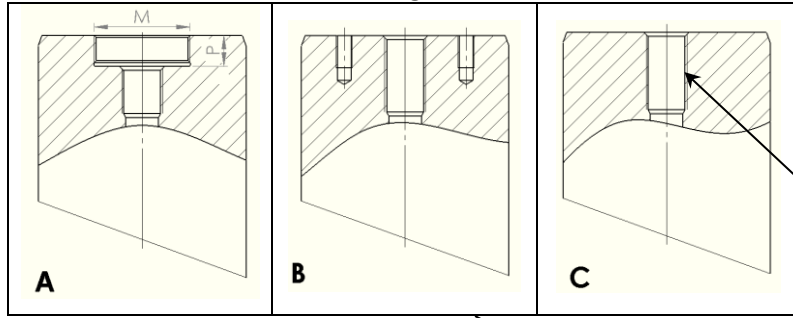
The **D2S** device acts as a compact, high-quality dependable spring.

- a) It maintains the top work roll assembly in an elevated position when the mill is not running.
- b) The work rolls are maintained separated at a constant centre to centre distance during installation, removal and transfer of rolls.
- c) The rolls are prevented from coming into contact with the each other, thereby avoiding damage to the roll surfaces.
- d) The use of **D2S** Springs eliminated the need to jack up the top work roll and then block or latch for correct roll separation on fixed centres. In doing so it eliminates the need for additional shimming required for the safe and stable transportation of roll assemblies and obviates the need for troublesome latching mechanisms.
- e) The use of **D2S** Springs “reduces the time required for roll changing” to one quarter of the time taken by conventional methods.
- f) In some applications **D2S** Springs can be used for back-up roll counter balance.

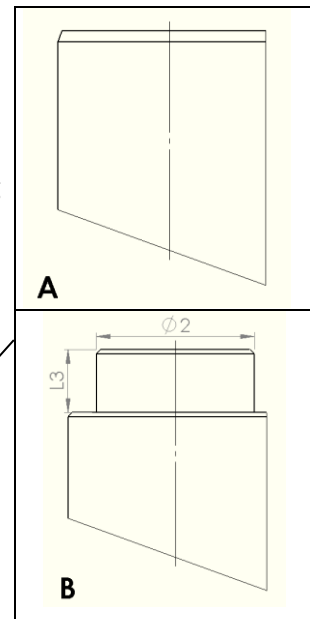
By the use of hydraulic pressure under the **D2S** Springs, the top work roll assembly may be raised higher than the normal extended position the spring allows. This is achieved by the hydraulic pressure raising the complete spring off its seat in the base of the cavity. During rolling this hydraulic pressure may be used to create upward forces to correct roll bending, reduce work roll skidding or counterbalance the top back-up roll.

## DATA REQUIRED TO SELECT A D2S SPRING

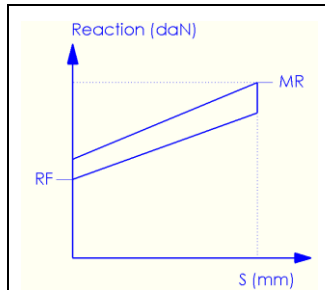
### D.D.1 Common reservoir end designs



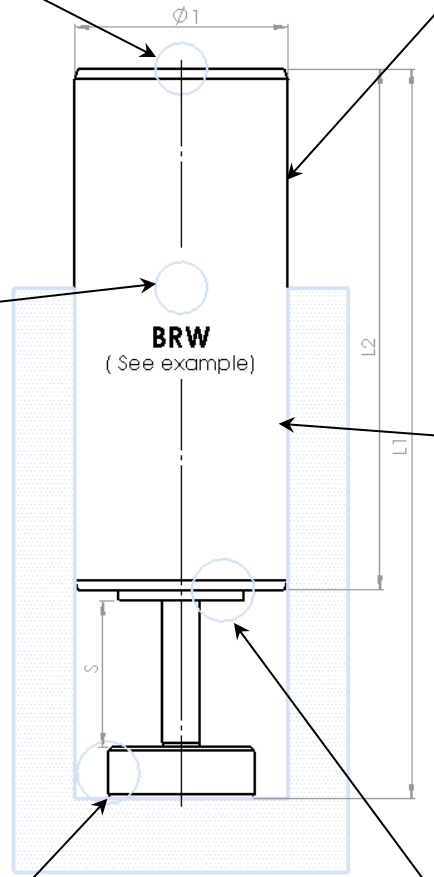
### D.D.2 Common reservoir configurations



### M.C: Mechanical Characteristic



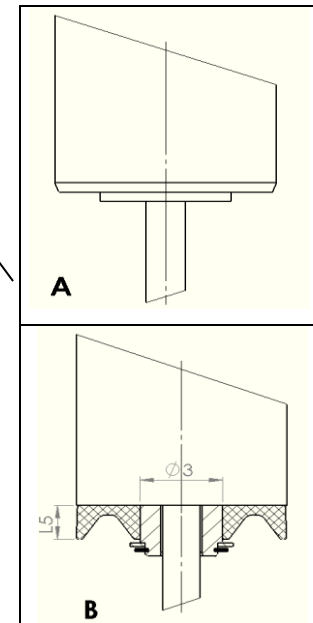
**RE** : RECALLING FORCE  
(Weight x 1,1)  
**MR** : MAXIMUM REACTION  
**S** : STROKE



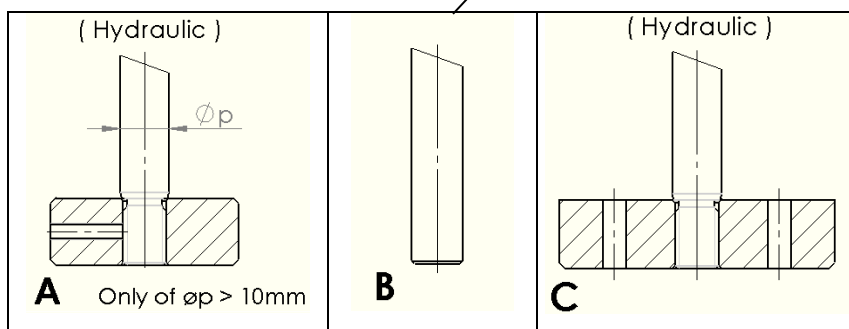
### D.D.3 Protection reservoir

Zinc plated <b>A</b>	Hard chrome plated <b>B</b>	Greased <b>C</b>
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### D.D.4 Piston rod collets with and without provision for hydraulic seals



### D.D.5 End of piston with or without provision for hydraulic fluid entry designs



### NOMENCLATURE

- MC** = Mechanical Characteristics  
RF ; MR ; S
- GC** = Geometrical Characteristics  
L1 ; L2 ; L3 ; L4 ; L5 ;  $\phi 1$  ;  $\phi 2$  ;  $\phi 3$  ; M ; P
- DD** = Details of Design  
1(A,B,C) ; 2 (A,B) ; 3(A,B,C) ; 4(A,B,C,D) ; 5(A,B,C,D,E)

### NOTE

- Example of nomenclature of D2S Spring Shown above.  
MC: RF 11000 ; MR 33000 ; S 45  
GC : L1 220 ; L2 152 ;  $\phi 1$  80  
DD : 1C ; 2A ; 3A ; 4A ; 5B

**Stroke calculation :**

S= maximum diameter-minimum diameter  
+ d + extra

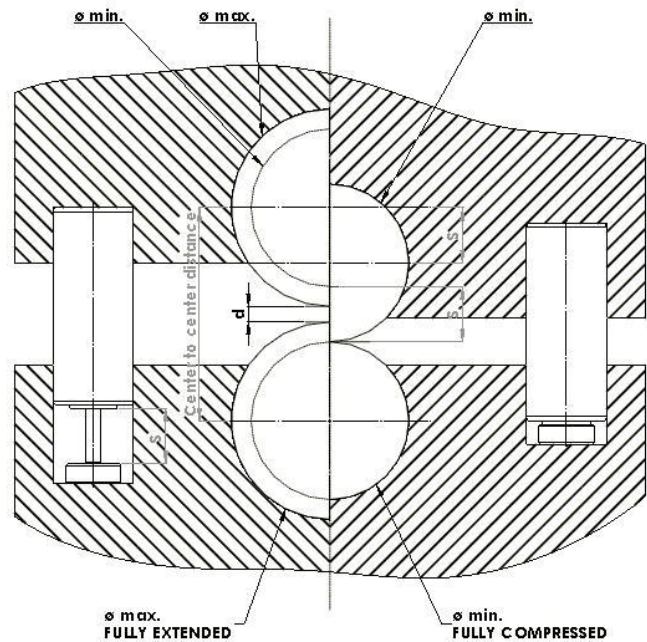
S= centre to centre distance – minimum  
diameter + extra

**Load per D2S Spring calculation:**

Top work roll chock assembly weight divided by  
total number of D2S Springs used (generally two per  
chock).

**Note:**

D2S Springs may also be used as plungers in  
combination with hydraulic pressure ( as for roll  
bending, etc...)



**Dyna Shock System**



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