



SHIMLESS TOOLING:

Shimless tooling is modern concept available in market for slitter tooling. By name, it implies that managing slitters without using plastic shims. Plastic shims are soft and compressible. While being used on slitter in a stack, upon tightening by locknut; each plastic shim compresses non-uniformly and hence horizontal clearance keeps changing while knife rotates, because face runout keeps changing.

Usually in shimless tooling DeeTee provide series of fractional metallic spacers, in order to facilitate the operator to set desired clearance using metallic spacers only. Shimless tooling is most popular in CR slitters, as coils are clean, slit width tolerance is close and comparatively health, maintenance of the slitter is better (compared to HR slitter). DeeTee also promote rubber bonded metallic spacers or bonded stripper rings (BSR) with shimless tooling in place of loose rubber rings. We suggest to use male and female BSRs in pair depending upon coil thickness range and requirement of precision.



Depending upon slit width tolerance DeeTee suggest shimless tooling in precision, extra precision and ultra-precision tolerance. In precision grade, thickness of all tools is maintained within ± 0.003 mm through surface grinding operation with surface roughness of $0.4\mu\text{m}$, while in extra precision grade, thickness tolerance is maintained within ± 0.001 mm through super finishing and lapping operation with surface roughness of $0.2\mu\text{m}$. In ultra-precision grade; tolerance is same as extra precision grade, but we segregate the jobs wrt, its actual size and mark as follow:

- If Job thickness deviation is “0.000 mm” from its nominal thickness we mark “0” on the face
- If Job thickness deviation is “0.000 mm to +0.001mm” from its nominal thickness we mark “+” on the face
- If Job thickness deviation is “0.000 mm to -0.001 mm” from its nominal thickness we mark “-” on the face
- If Job thickness deviation is “-0.001mm to +0.001mm” from its nominal thickness we mark “=” on the face



DeeTee Industries Limited

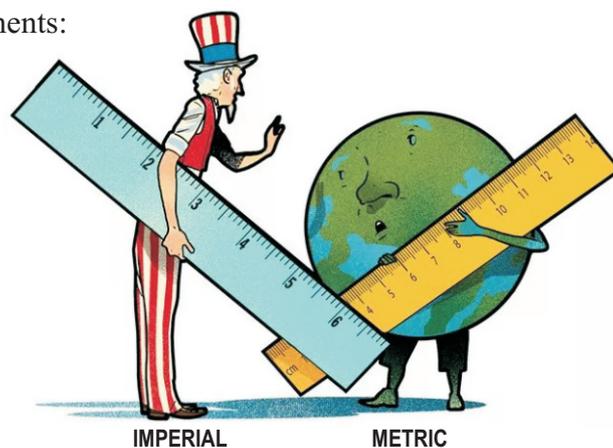
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DeeTee stands for total quality movement

With this segregation; user can alternate the + and – grade jobs or use only 0 grade jobs to control the actual width and achieve better slit width tolerance.

DeeTee slitter tooling package consists of following components:

1. Set of Knives – Based upon application
2. Metallic Spacers – Whole number spacers
3. Metallic Spacer – Fraction spacers
4. Starting spacer – Based upon arbor pair
5. Male and Female BSRs
6. Overarm Separator Discs
7. Overarm Spacer
8. Slitter tooling management software – Smart Slit®



WORKING WITH SHIMLESS TOOLING:

As described earlier we use shimless tooling to avoid the usage of plastic shims. In order to achieve so, we propose, series of fraction of spacers. For example,

- Sample calculation for making fraction width of 127.73mm
- For 0.03mm: We will use $3.02 + 3.01 = 6.03\text{mm}$
- For 0.70mm: We will use $3.60 + 3.10 = 6.70\text{mm}$
- Hence to make 0.73: we have used $3.02 + 3.01 + 3.60 + 3.10 = 12.73\text{mm}$
- Now out of 127.73, we have made 12.73mm and remaining whole number is $127.73 - 12.73 = 115\text{mm}$
- Remaining 115mm can be made by using whole number spacers such as $100 + 10 + 5 = 115\text{mm}$ etc.
- $127.73 = 100 + 10 + 5 + 3.60 + 3.10 + 3.02 + 3.01\text{ mm}$

Inventory of Fraction Spacers	
Step of 0.10mm	Step of 0.01mm
3.10	3.01
3.20	3.02
3.40	3.04
3.60	3.06
3.80	3.08

We can take one more example in imperial system (inches)

- Sample calculation for making fraction width of 7.594"
- For 0.004": We will use 0.304"
- For 0.090": We will use $0.380" + 0.310" = 0.690"$
- Hence to make 0.094": we have used $0.304" + 0.380" + 0.310" = 0.994"$
- Now out of 7.594", we have made 0.994" and remaining number is $7.594" - 0.994" = 6.600"$

Inventory of Fraction Spacers		
Step of 0.100"	Step of 0.010"	Step of 0.001"
0.100"	0.310"	0.301"
0.200"	0.320"	0.302"
0.400"	0.340"	0.304"
0.600"	0.360"	0.306"
0.800"	0.380"	0.308"

- Remaining 6.600” can be made as follows:
- For 0.600”: We will use 0.600”
- Remaining 6” can be made using whole number spacers such as 4” + 2” = 6”
- 7.594” = 4” + 2” + 0.600” + 0.380” + 0.310” + 0.304”

BENEFITS OF SHIMLESS TOOLING:

Shimless tooling is primarily designed for CR (Cold Rolled) slitters, reason being very obvious that CR slitter demands utmost and tight slitting tolerance; and hence shimless tooling is an ideal selection for this objective. Shimless tooling helps in minimizing wastage, as slit width accuracy is consistent over various setups and no more trial and error methods are required to generate perfect slits.

Usage of shimless tooling is also about the improvement in stripper ring practices. DeeTee promote to use proper sets of male and female BSRs (Bonded Stripper Rings) to minimize various slitting defects.

We also closely monitor the collar offsets of all slitter pairs and design the starting spacer for each of them to achieve exactly the same slit width accuracies by all pairs.

WHAT IS Smart Slit®:

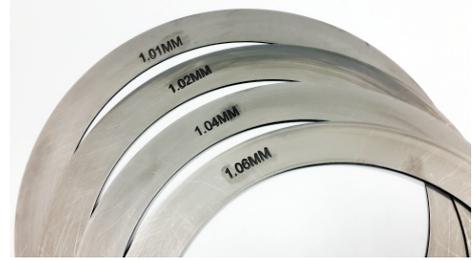
Smart Slit® is an industry-oriented slitter line tooling management software. Smart Slit has been developed through years of experience, know how and engineering approach in the field of metal cutting. We have designed the software to work in metric as well as imperial system. Smart Slit helps the user to generate accurate and fast setups, minimize waste and improve system efficiency. With Smart Slit we can prevent knife chipping and blunting. Software helps in examining tool life and performance. It helps in improving and adopting better stripper ring practices. There are plenty of dimension in which Smart Slit can help your organization.

SALIENT FEATURES OF Smart Slit®:

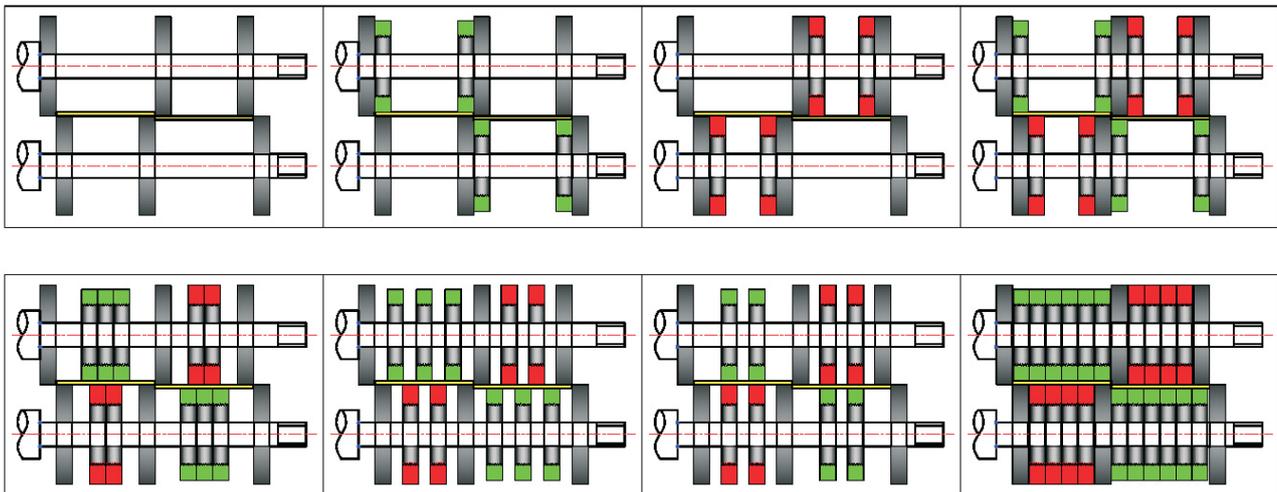
- One software for all slitting lines
- Support metric and imperial (inches) system
- Male-Female and progressive slitting
- + - 0 = Tolerance wise inventory input
- Slitter and over arm management
- Works with rubber rings and rubberized spacers both
- Calculation support: metric upto 3 decimals & imperial upto 4 decimals
- Min. Clearance: Metric – 5/10 microns and Imperial – 12.7/25.4 microns (1/2 or 1 thou)



- Data archiving and historical data
- Knife & BSR Regrinding Management and Life Monitoring through history cards
- Application mapping for various knives and alternate knife selection
- Automatic clearance selection
- Slit width tolerance compensation
- Bar Codes print on Reports
- Elimination of setup mistakes
- Easy operation and industry-oriented software
- Software intelligently helps in selecting the optimum sizes & nos. Of spacers out of existing inventory.
- Easy data input in national language
- Reverse printing option for turret head
- Robotic loading and unloading



Usage of the software along with shimless tooling adds immense capability and potential to the user to extract best out of slitting lines. Slitting now a days is no longer a cutting operation, it has become very scientific, predictable and controllable. Smart Slit® along with shimless tooling has become savior to cope up to the industries demands.



• QUALITY POLICY •

We, at **Dee Tee Industries Ltd.** are committed to provide best quality product at competitive price while maintaining high quality standards for customer delight. We will achieve it by - Active involvement and empowerment of our employees, Continual improvement in our quality systems, Technological up-gradation.