Introduction – 'Die Press' web application calculates the radial and tangential stresses in the inserts and casing in an interference-fit tool It determines assembly. the optimum interference between the insert(s) and the casing to withstand the forging pressure for the metal forging application. For a two or three ring die assembly, it can determine their dimensions that would allow the dies to take the maximum internal pressure. This web application has been developed for tool designers and engineers in the metal forming field including cold forging, hot forging, extrusion and press fitting applications.

Application - Cold and Hot forging tooling, Extrusion Tooling, Press fitting of components. Any application where the tool must withstand high internal pressure.

Analysis Included in the Software - The software uses the simple theory of thick cylinders to determine the following:

- Radial and tangential stresses in one ring, two ring and three ring die assemblies with press fit and internal forging pressure
- 2. Optimum Interference to withstand internal pressure in a two and three ring die assembly
- 3. Optimum Insert Outer Diameter in Two ring assembly for given insert bore and outside diameter of casing
- 4. Optimum Insert / Middle Sleeve Diameters in a Three ring assembly for given insert bore and casing outside diameter
- 5. Fatigue Plot This plot shows the stress amplitude and mean stress that determines life of a tool under fatigue conditions.
- Calculation of 'Set Back distance' for taper insert – casing assembly
- 7. Press Force required to assemble two components under interference conditions.











3 PIECE STRAIGHT PRESS FIT



3 PIECE TAPER PRESS FIT

Benefits - Helps to Improve tool life. Allows die assembly to work under higher die pressure. Determines the inserts and casing dimension that optimizes tool material usage. Determine the best press fit amount quickly. Visual presentation of stress helps in understanding the effect of interference fit in tools.

Available Calculations -

- 1. Single Ring Internal & External Pressure
- 2. Two Ring Die Assembly Stresses
- 3. Two Ring Die Assembly Interference
- 4. Two Ring Die Assembly Optimum Dimension
- 5. Three Ring Middle Slotted Assembly Stresses
- 6. Three Ring Die Assembly 32-1 Stresses
- 7. Three Ring Die Assembly 32-1 Optimum Dimensions
- Three Ring Die Assembly 123 Holistic Stresses
- 9. Three Ring Die Assembly 123 Holistic Interference
- 10. Three Ring Die Assembly 123 Holistic Optimum Dimensions
- 11. Suggested Dimensions Casing / Inserts
- 12. Interference Fit Press Force
- 13. Taper Setback Calculator

Cost - \$200 / Year. Click to Purchase

Contact – info@nagform.com

Company Information

Metal Forming Systems, Inc. 7974 N. Lilley Road Canton MI – 48187 Ph. 734.6581716





EXAMPLES

1. Single Ring – Internal & External Pressure



2. Two Ring Die Assembly – Stresses



3. Two Ring Die Assembly – Interference





4. Two Ring Die Assembly – Optimum Dimension

5. Three Ring Middle Slotted Assembly – Stresses



6. Three Ring Die Assembly 32-1 - Stresses



7. Three Ring Die Assembly 32-1 – Optimum Dimensions

Calculate Insert Dimensions: Based on Griterion that Insert. Middle Insert and Casing Vield Under Pressure at Same Time. Mid Insert and Casing assembled first, then Inser assembled	t Tangential Stress — Radial Stress —	4
Insert Mati-> Carbide (K3109) ~	Scale X 1000	167
ID 1	/	134
Yield Strength: 175000		
Middle Inset Matl-> M2 (RC59-61) ~		67
Yield Strength: 150000		
Casing Matl-> H13 (RC46-49)		-(1)
Yield Sprength: 125000		
0D 6 Catrolote		
RESULTS : 3 Ring 32-1 Assy Opt. Dim.		
English: Length Tiri, Stress Tabuhof, X 1000 Metric Length Trim, Stress Rolmm2, X 1000 Effective Stress based on Von Mises	Inset OD; 1.97061	Middle Insert OD: 159585
	Interference in Dia. Middle-Casing: 0.00934	Interference in Dia, Insert-Middler 0.00766
	Interference Pres. Middle-Casing: 20090.8	Interference Pres. Insert-Middle: 55311.4
	Max. Forming Pressure: 157494.8	
	INSERT	
	Tang, Stress-ID 9660.2	Tang. Stress- OD: -52395.1
	Radial Stress -ID: -157494.8	Radial Stress -OD: -95439.4
	Due to Interference-new ID: 0.998188	
	MIDDLE INSERT	
	Tang Stress-ID 61089.7	Tang. StressOD: 6364.7
	Radial Stress -ID: -95439.4	Radial Stress -OD: -40714.5
	CASING	
	Tang Stress-ID 86315.1	Tang, Stress- OD: 45600.6

8. Three Ring Die Assembly 123 Holistic – Stresses



9. Three Ring Die Assembly 123 Holistic – Interference

Insert Mati-> Carbide (ND20)		
	Ellinction Talence (Von Misso	en
Max Eff. Stress. Insert: 200000	Scale X 1000	
Insert ID: 1	/	
Insert OD: 2		
Middle Insert Mati-> M2 (RC59-61)	- /	
Max Uff. Stress. Middle Insert: 200000		
Middle Insert OD: 3.5		
Casing Matt-> H13 (RC46-49)		
Max Eff. Stress, Casing: 250000		
Casing OD: 6		
Calculate		24
RESULTS: 3 Ring Assy - Interference		240
English: Length 'm', Stress 'Ubs/In2', X 1000 Metric: Length 'mm', Stress 'N/mm2', X 1000		
Effective Stress based on Von Mises	Forging Pressure: 224612.21655	
	Max. Interference Middle-Casing: 0.02108	Max. Interference Insert-Middle: 0.00486
	Interference Pres. Middle-Casing: 70012.1	Interference Pres. Insert-Middle: 98425.5
	INSERT	
	Tang. Stress- ID -24812,2	Tang. StressDD:99812.2
	Radial Stress -ID: -224812.2	Radial Stress -OD: -149012.2
	Due to Interference-new ID: 0.996359	
	MIDDLE INSERT	
	Tang Stress-ID 50187.8	Tang. Stress-OD: -17159.2
	Radial Stress -ID: -149812.2	Radial Stress -OD: -82465.3
	Radial Stress -ID: -149812.2 CASING	Radial Stress -OD: -82465.3
	Radial Stress-ID: -1496122 CASING Iong. Stress-ID: 16/3347	Radal Stress - DD: 42465.3

same time	Effects	
Insert Matl-> Carbide (ND25)	v Scale	× 1000
D: 1		144
Vield Strength: 175000		
Middle Insert Mati-> M2 (RC59-61)	·	70-
Seld Strength: 150000		35
asing Mati-> H13 (RC46-49)		
Seld Strength: 125000		
Dt. 6 Calculate		105
RESULTS : 3 Ring Assy Opt. Dim.		-14
		115
ingristic Length Im. Stress Losyinz, A 1000 Metric Length Imm', Stress N/mm	2, X 1000	
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10. Three Ring Die Assembly 123 Holistic – Optimum Dimensions