폭연방지기 스프링의 구조해석에 관한 연구

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A study of Flame Arrestor's Spring Structural Analysis

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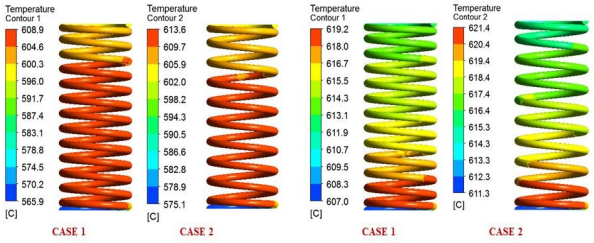
Key Words : Spring Road, Elasticity, Three-dimensional Model, CFD, FEM.

IV. Results and discussions

4.1. The temperature of Gas Burning Flame Flow and Spring

4.1.1. The temperature of Spring



Temperature contour of spring (after *180 s*)

Temperature contour of spring (after *240 s*)

Fig. 13 Temperature Contour of Spring in Case 1 and Case 2 (After 180s and 240 s under flame)

II. Methodology

2.2. Meshing for CFD and Static Structural of Spring Model

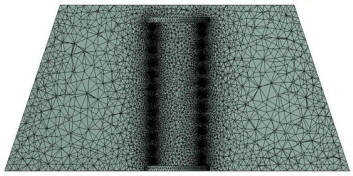


Fig. 3 Meshing for CFD domain

Fig. 4 Meshing for Static Structural domain

Mesh information	Units
Mesh type	Hybrid mesh
Total number of node	546,364
Total number of elements	2,874,600

Mesh information	Units
Mesh type	Hybrid mesh
Total number of node	415,295
Total number of elements	225,515

I. Introduction

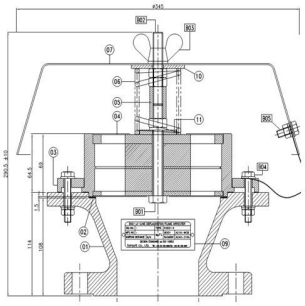


Fig. 1 Flame Arrestor KSED 2,4

No.	Descriptions	Material Properties
1	Body	Stainless Steel
2	Gasket	Graphit, Teflon
4	Element Assembly	Stainless Steel 316L
5	Fuse	Polycarbonate
6	Spring	Stainless Steel 316L
7	Hood	Stainless Steel 316L
8	Wire	Stainless Steel 316L
10	Washer	Stainless Steel 316L
11	Ring	Stainless Steel 316L

KSED-2,4 Spring Properties		
Descriptions	Case 1	Case 2
Spring Material	STS 316	STS 316
Spring Inside Diameter	46 mm	46 mm
Wire Diameter	5 mm	5 mm
No. Active Coil	11	10
Free Length	130 mm	130 mm
Spring Deflection	60 mm	60 mm
Spring Load	24.72 kg	22.5 kg

III. Setup CFD and Structural Analysis

3.1. Setup Structural Analysis

STS 316 material properties	
Density	8000 kg/m3
Young's Modulus	175 GPa
Bulk's Modulus	130 GPa
Tensile Yield Strength	290 MPa
Compressive Yield Strength	290 MPa
Tensile Ultimate Strength	627 MPa
Compressive Yield Strength	627 MPa
Melting Point	1673 K
Specific Heat	530 J/kg.K
Thermal Conductivity	17 W/m.K

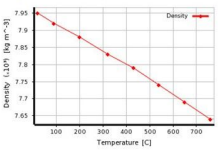


Fig. 7 Density and Temperature Graph

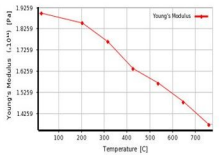


Fig. 8 Young's Modulus and Temperature Graph

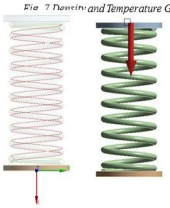


Fig. 10 Lower plate fixed support and Force Load

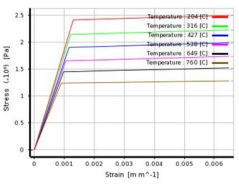


Fig. 9 Bilinear Isotropic Hardening Graph

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