

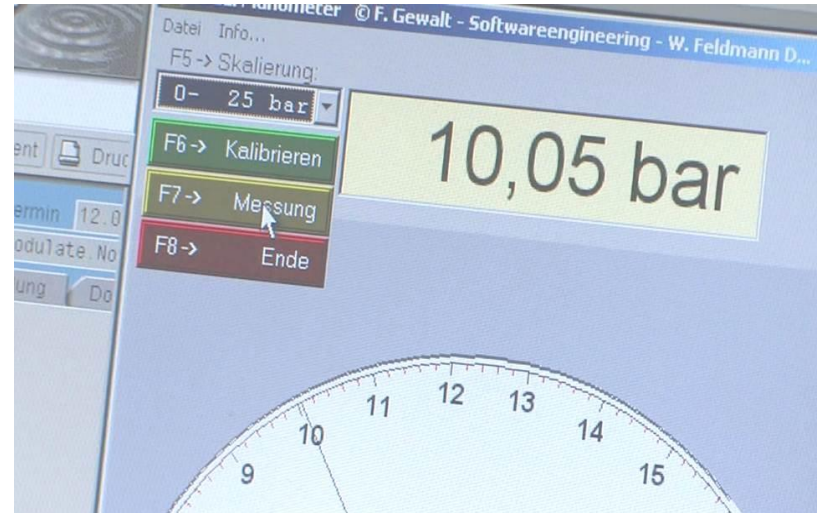
## Factors influencing the Functional Characteristics



# Objectives of this Presentation. Expand specialized knowledge.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

The objective of this presentation is to explain the **different factors that influence the functional characteristics** of the safety valve.



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# General. Vessel requirements.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

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- ➔ Safety valves must be dimensioned and set in such a way that an **overrun of the maximum permissible working pressure** of the vessel **of more than 10%** is prevented.
  
- ➔ **In accordance with:**
  - ASME Sec. VIII
  - API 520
  - ISO 4126-1
  - AD 2000 Merkblatt A2, Para. 2.2

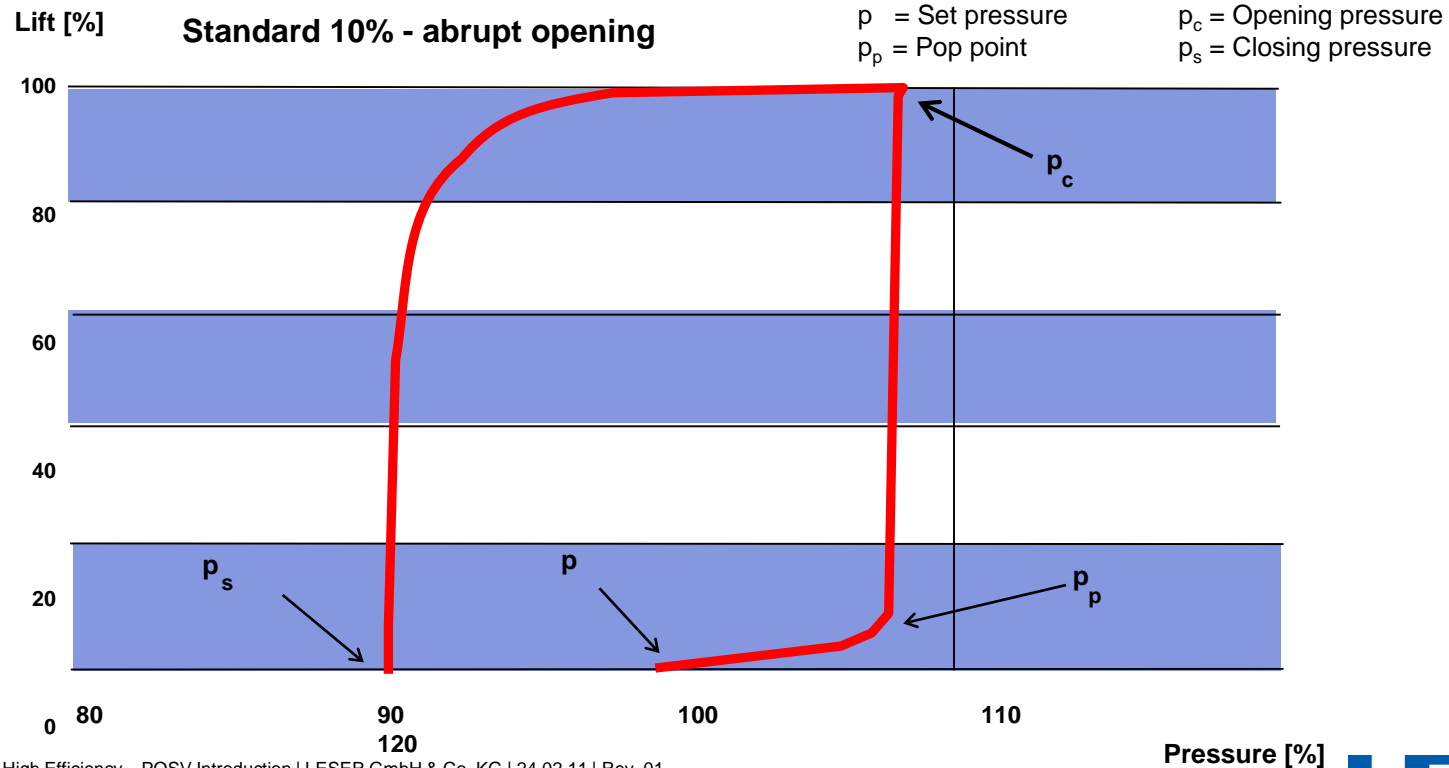


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# Functional Characteristics. Standard safety valve acc. to AD 2000-Sheet A2.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary



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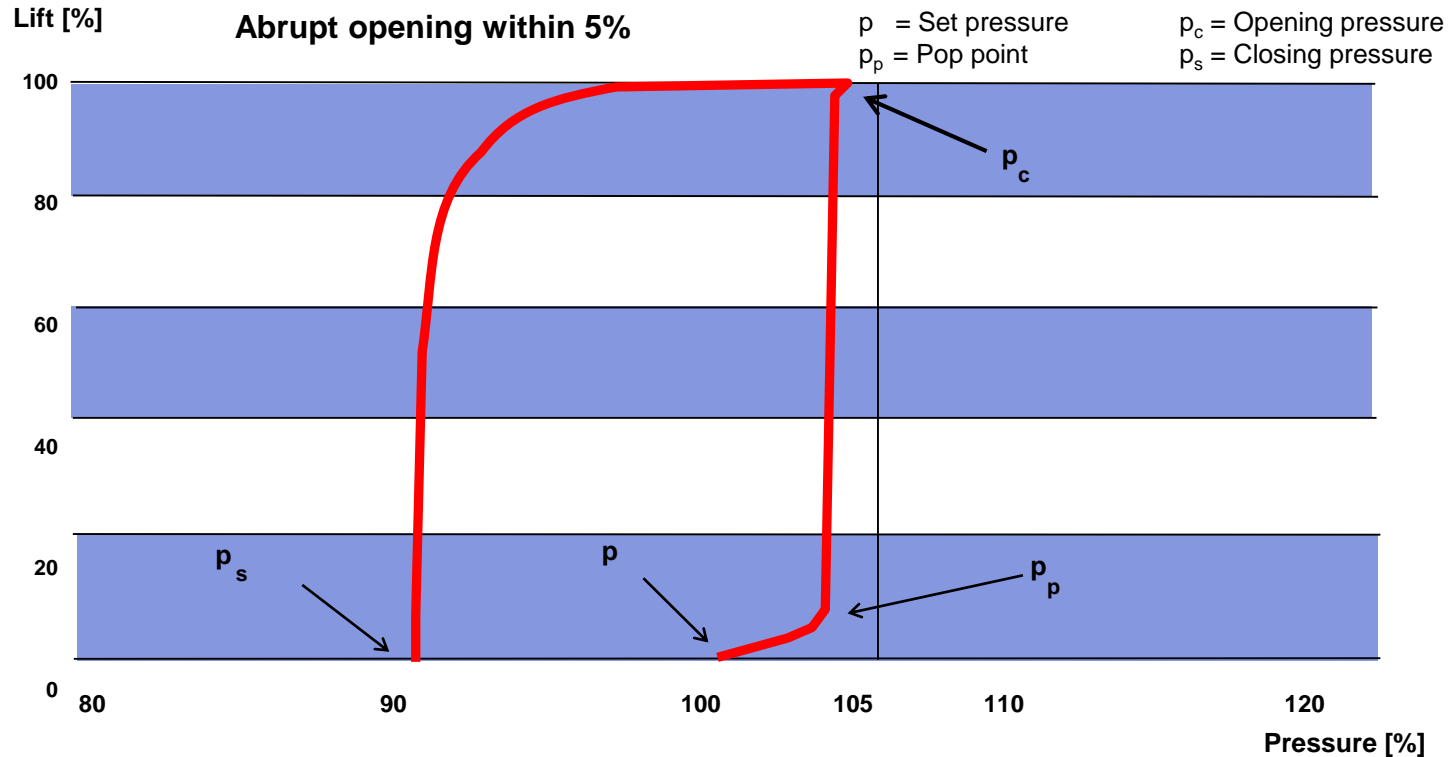
Pressure [%]

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# Functional Characteristics. Full-lift safety valve acc. to AD 2000-Sheet A2.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

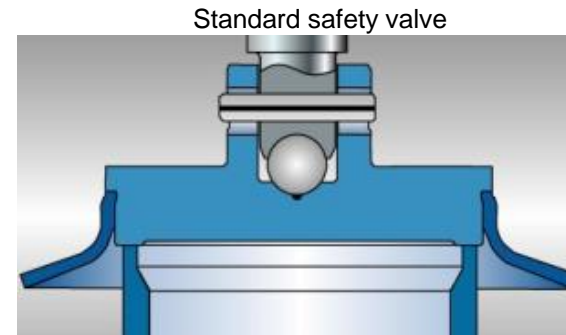
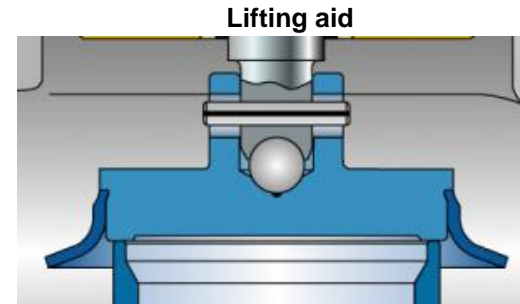
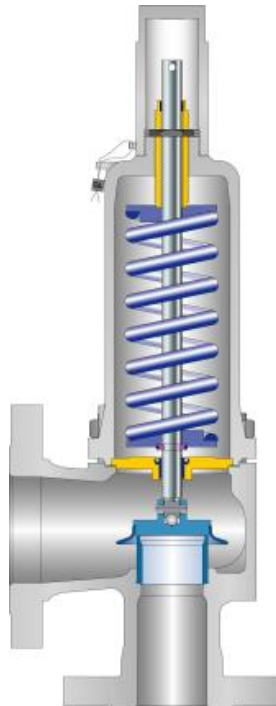


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# Functional Characteristics. Pop characteristics.

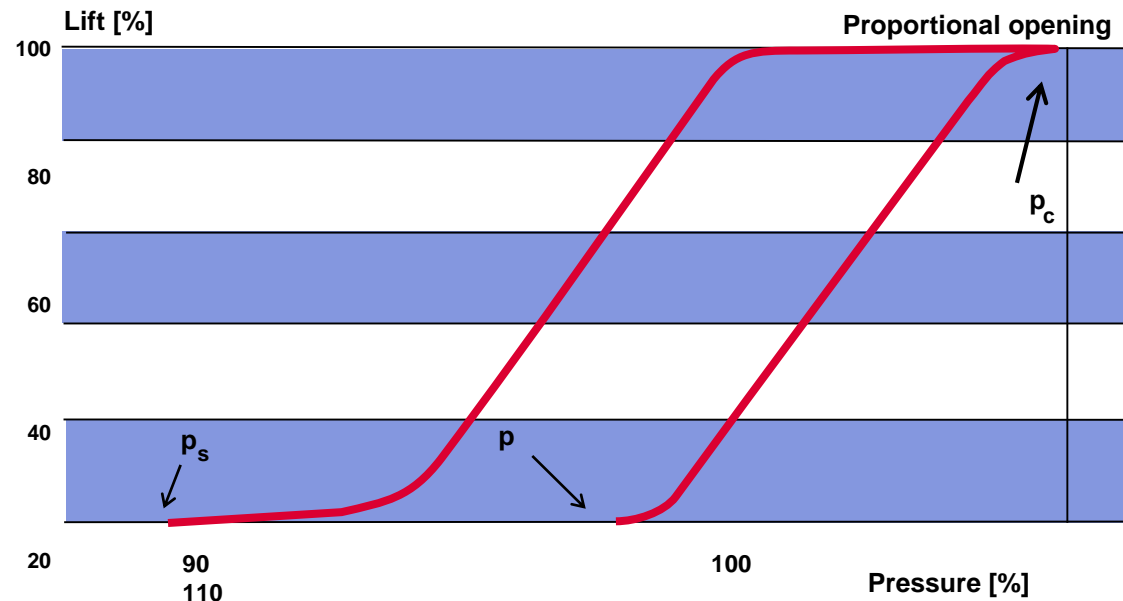
1. Objectives | 2. General | 3. **Functional Characteristics** | 4. Factors influencing the Opening Characteristics | 5. Summary



Full-lift safety valve  
according to AD 2000 Merkblatt

# Functional Characteristics. Proportional safety valve acc. to AD 2000 (A2).

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary



$p$  = Set pressure

$p_c$  = Opening pressure

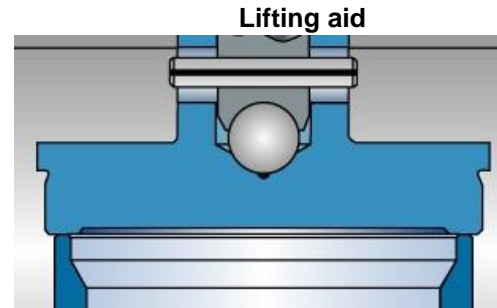
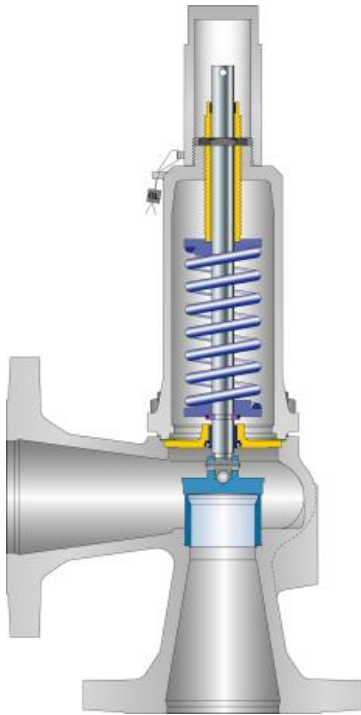
$p_s$  = Closing pressure

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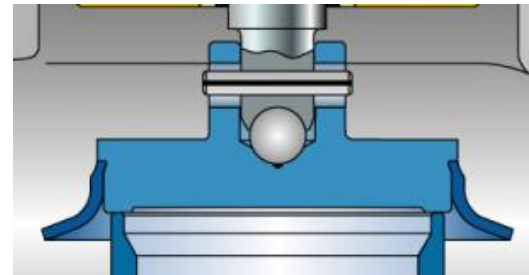
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# Functional Characteristics. Proportional safety valve.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary



Proportional safety valve



Standard safety valve

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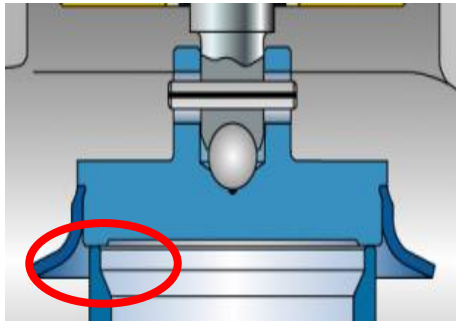
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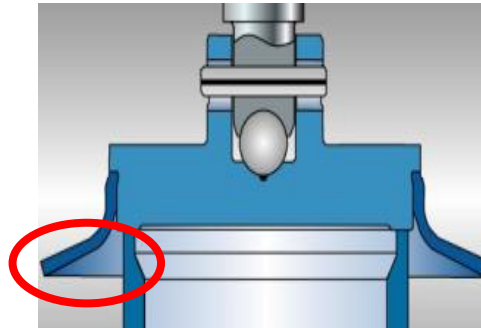
## Influencing Factor. Lifting aid.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

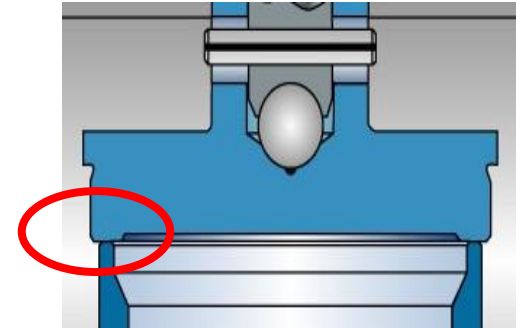
The shape of the lifting aid has a decisive effect on the operation and performance (lifting behaviour) of the safety valve



Standard safety valve



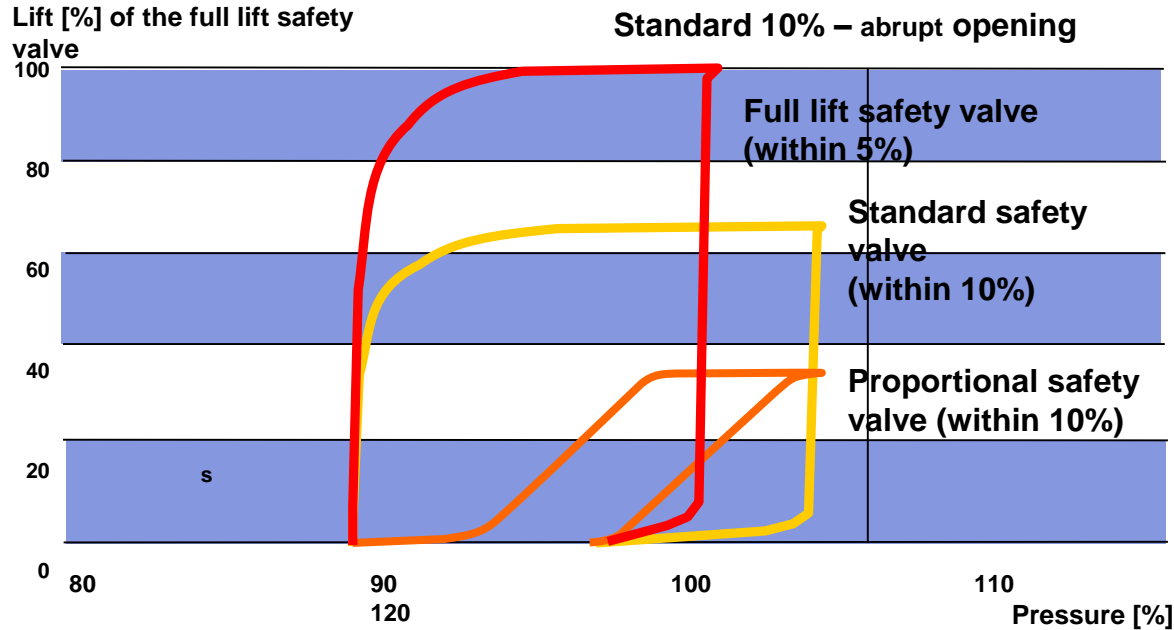
Full-lift safety valve



Proportional safety valve

# Influencing factor. Performance comparison.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary



$p$  = Set pressure  
 $p_p$  = Pop point

$p_c$  = Opening pressure  
 $p_s$  = Closing pressure

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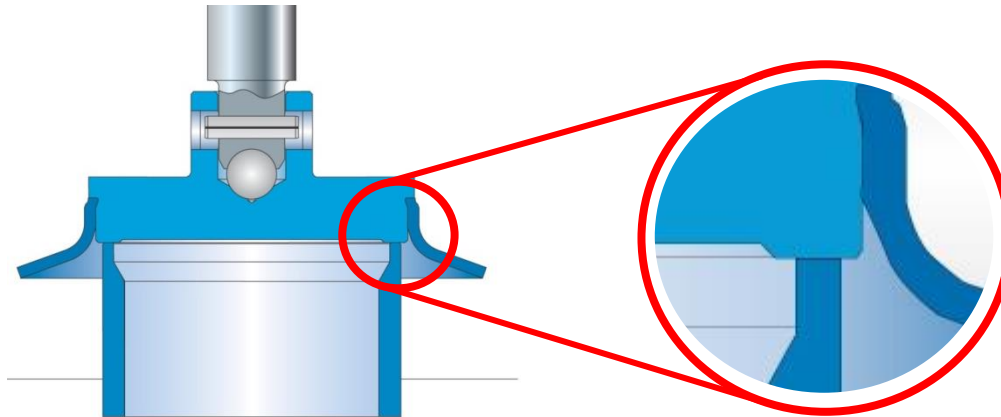
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# Influencing Factor. Seat.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

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The different chamfers on the valve seat have a decisive effect on the flow behaviour and thus on the operation and performance (lifting behaviour) of the safety valve.



# Influencing Factor. Spring.

1. Objectives | 2. General | 3. Functional Characteristics | 4. Factors influencing the Opening Characteristics | 5. Summary

- The desired set pressure is realised with the spring.
- The dimensioning of the spring must be suitable for installation in the bonnet of the safety valve.
- The spring rate for the designated set pressure must correspond to the spring table LGS 3600.ff.

## Disadvantages if spring rate is too low

- The permitted closing pressure is exceeded.

## Safety risk if spring rate is too high

- The required lift for the necessary coefficient of discharge is not reached.
- This may be a real safety risk.



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# Summary.

1. [Objectives](#) | 2. [General](#) | 3. [Functional Characteristics](#) | 4. [Factors influencing the Opening Characteristics](#) | 5. **Summary**

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- A safety valve consists of individual components that are exactly matched to each other.
- The complete disc, seat and compression spring are decisive for the operation, performance and seal tightness of the safety valve.
- The requirements placed on operation and seal tightness of the safety valve can be met under all operating conditions only by careful treatment of the safety valve.

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**Factors influencing the**  
Thank you for your attention.

