

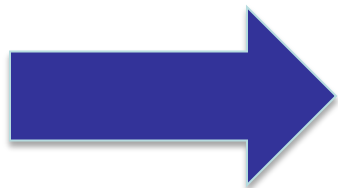
# Hoesch Schwerter Profile GmbH

*- From a Profile Manufacturer  
to a System Supplier -*

April 2016



- Ever shorter product life cycles due to increased competition
- Growing system and product requirements
- Rising demand for more flexibility in construction
- Increasing product differentiation
- Expansion of innovative capacity
- Reduction of costs

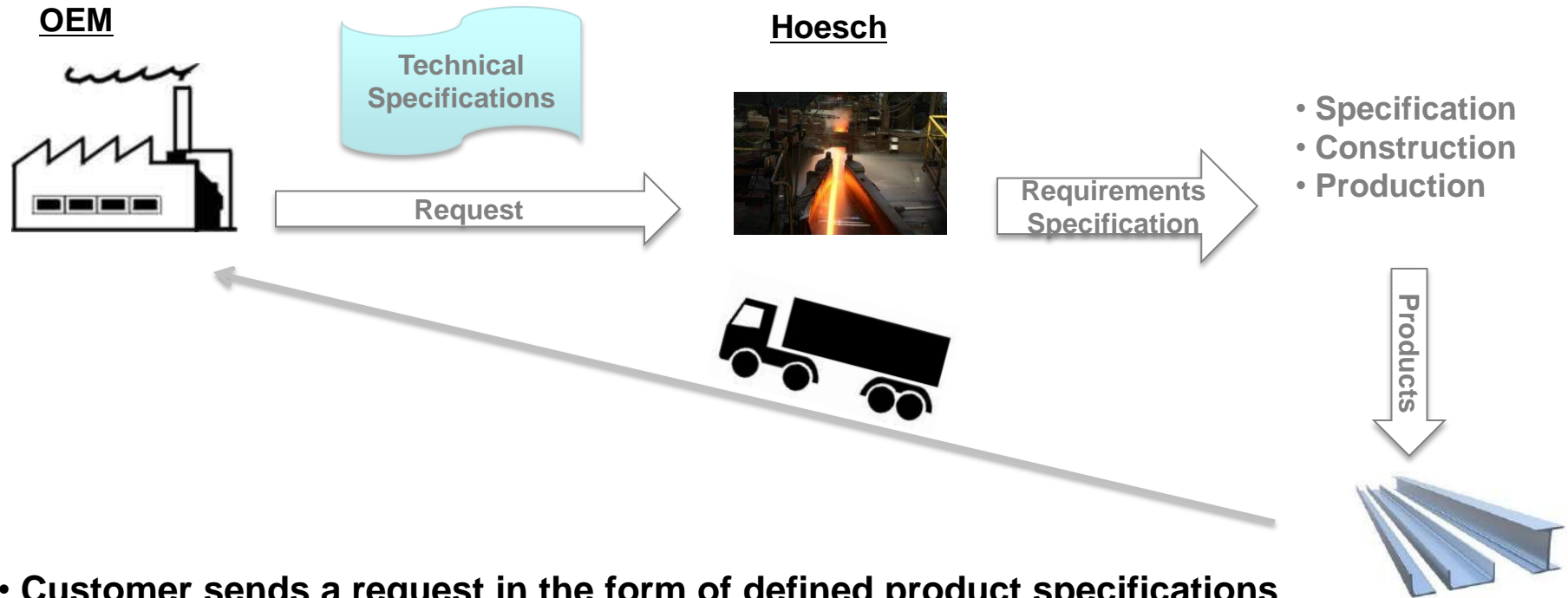


**Wide, solution-oriented range of services from development, construction, and manufacturing to delivery**

**Integration of the supplier in the development of technical concepts**

# Process Flow Profile Manufacturers

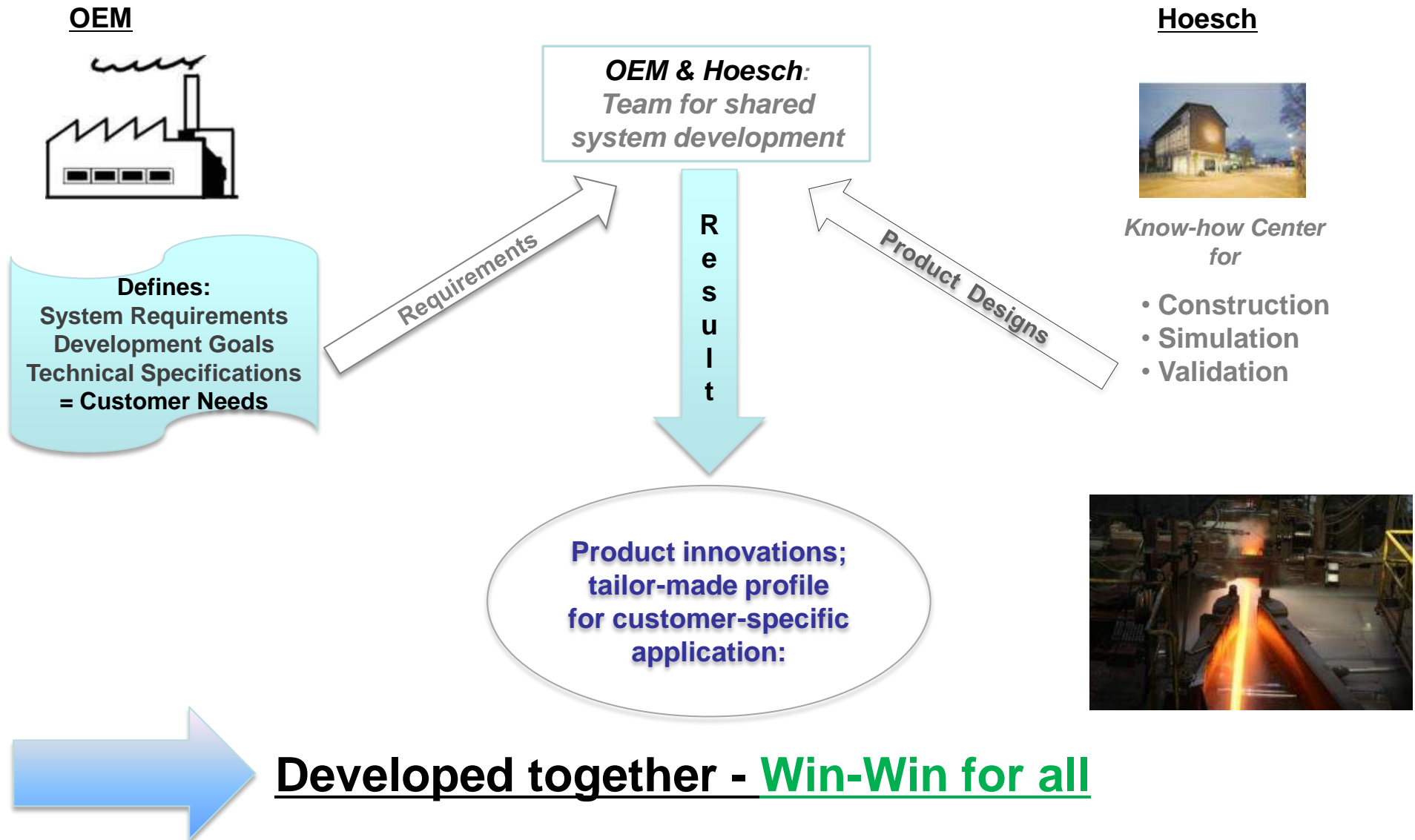
Product competence



- Customer sends a request in the form of defined product specifications
- Hoesch manufactures the product (profile) based on these specifications and delivers it to the customer
- The competence and value creation of HSP lies in the construction and production of the product so that it fulfills the specifications defined

# Process Flow System Supplier

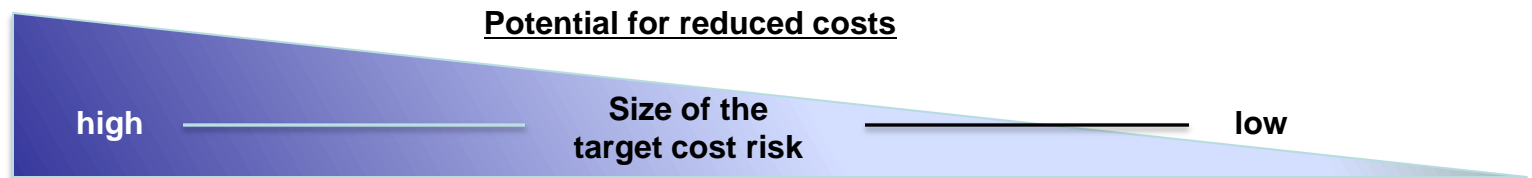
System and development competence



# Development at a System Supplier

System Supplier and Development Specialist

	Concept Phase	Development Phase	Production Phase
<b>Goals</b>	Derivation of target costs	Realization of target costs	Target cost agreement
<b>Direction of optimization</b>	Product innovations ⇒ Development know-how	Reduce costs through partnership ⇒ Efficient and effective construction	Market price analysis to determine a supply agreement for the products developed  ⇒ Product/process optimization
<b>Primary Focus</b>	Concept ⇒ Functions	Prototype / Developed Product ⇒ Functions / Product / Variants	



# Development at a System Supplier

From the idea to the customer-specific system solution

- **Perform research and development work together, including with external partners**
- **Continuous exchange of technological and design information**
- **Use of a wide variety of manufacturing processes**
- **Wide range of processing capabilities**
- **Custom logistics solutions**
- **Service and solution-oriented customer service**



Customer

Oriented

Product

Development



***- From the idea to the customer-specific system solution -***

➤ **4 different manufacturing processes at one location**

- ❖ Hot rolling
- ❖ Hot extruding
- ❖ Cold drawing
- ❖ SE-|M|<sup>®</sup> - milling

➤ **One Stop Profile Shop**





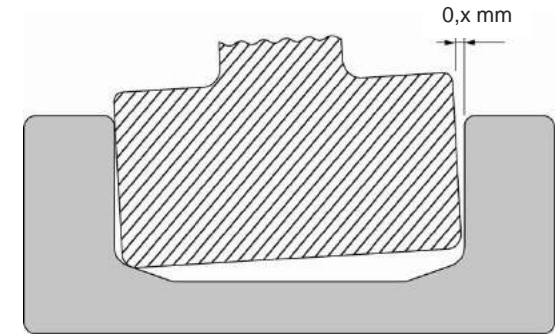
### Custom design of

- the basic geometry
- the individual features
- the tolerances

➔ *Restriction of specific features  
to enable optimization of costs  
in the value chain of the customer*



## ➤ Tolerance restrictions of up to 0.4 mm



➔ *Reduction of the roller diameter*

➔ *Simplified roller logistics / inventory management*



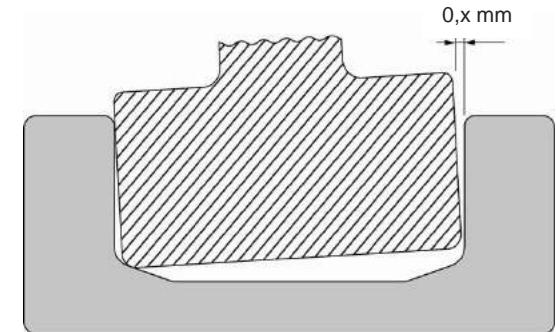
**Significantly lower costs due to lower stock of rollers and simplified assembly process**

## ➤ Further reductions

- Drawn profile      0.3 mm absolute
- SE-|M|<sup>®</sup>      0.2 mm absolute

➔ *Removal of the decarburized layer*

➔ *Harder surface*



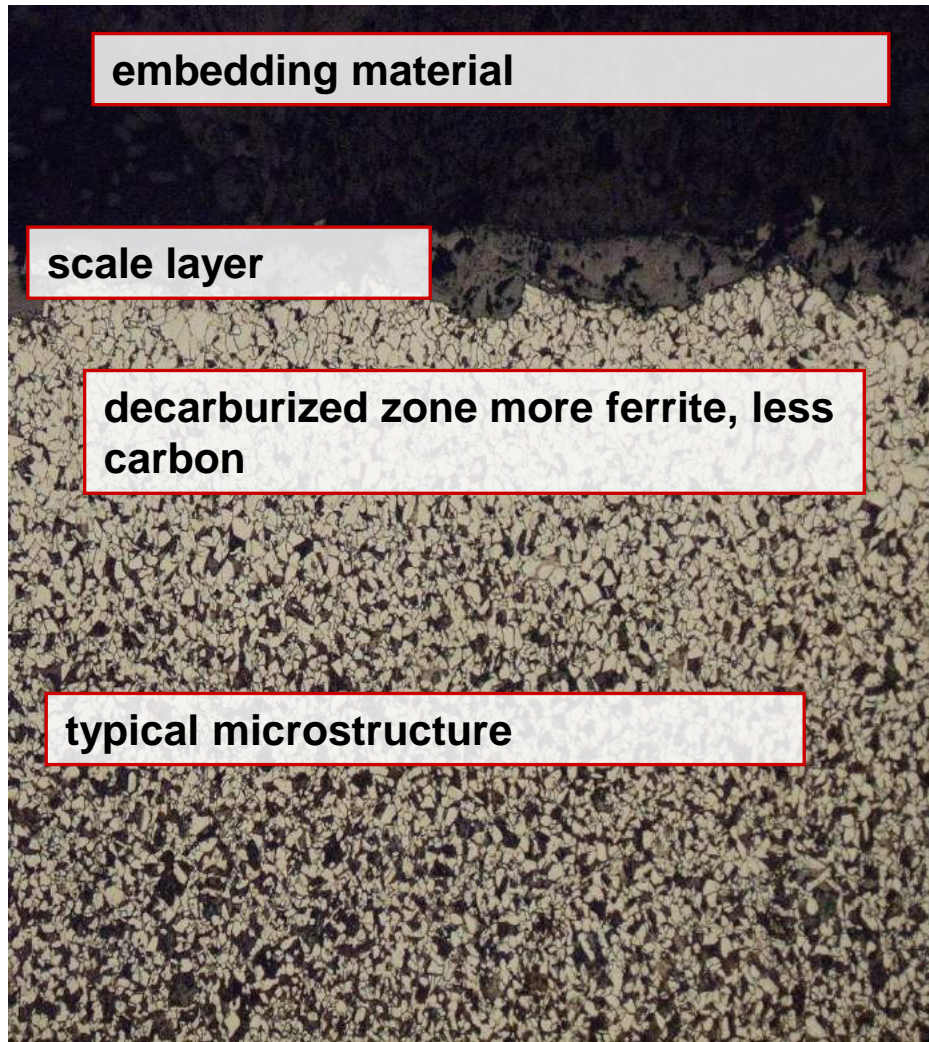
➔ **Significant improvement of the wear properties**



# SURFACE DECARBURIZATION

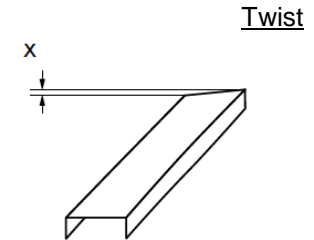
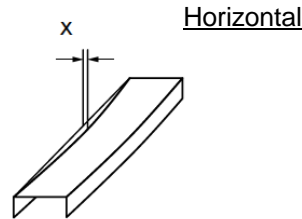
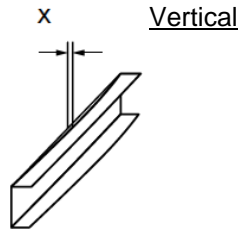
Micro-section layer

## Surface layer hot rolled profile



## Surface layer SE-|M|® profile





- 
- **Straightness tolerance of up to 0.3 mm/m**
  - **Twists of up to 0.4 °/m**

**using a straightening process that reduces residual stresses**

- ➔ ***No profile restraightening required any more***
- ➔ ***Component re-straightening requirements significantly reduced***



# Internal Stresses

A comparison between cold drawn and SE-IMI® profiles

## Results

Depiction of Plane 2 - vertical saw cut into the profile flanges:

The opening of the cuts is many times greater on the cold drawn profile than on the low stress hot rolled and SE-IMI® profiles.



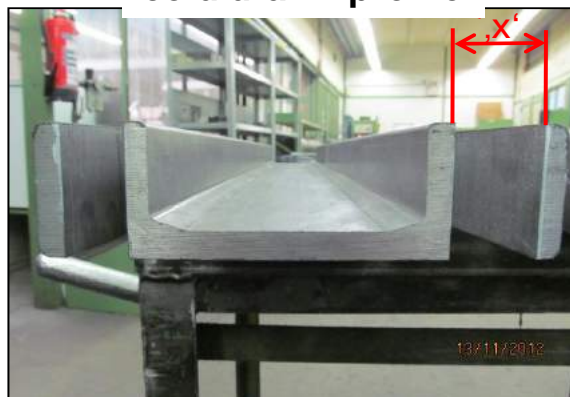
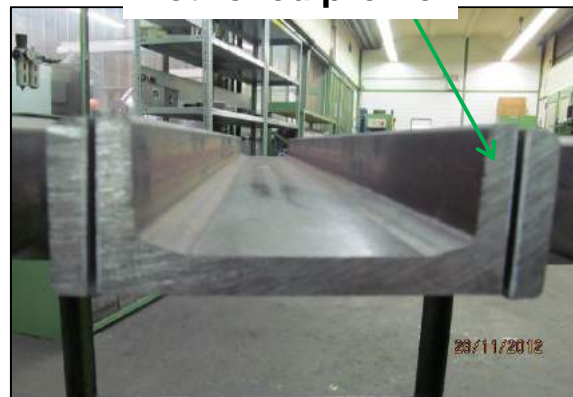
hot rolled profile



cold drawn profile



SE-IMI® profile



# Precision of straightening

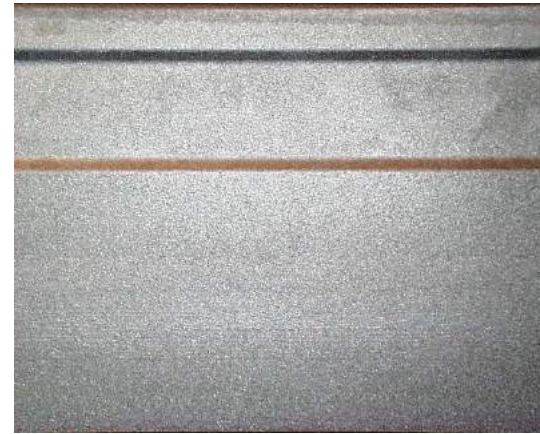
Status quo

**Customer requirements:**      **Bow on length (on flat and on edge): max. 0,3 mm/m**  
**Twist: max. 0,4 mm/m (related to the width of the profile)**

	I-beam 150 x 85 mm	I-beam 130 x 75 mm	I-beam 120 x 67 mm	I-beam 108 x 60 mm
Production stacking line	2.604 to	8.397 to	4.514 to	5.161 to
Bow on lenght (on edge)	94,6%	98,8%	96,7%	99,5%
Bow on length (on flat)	97,8%	98,2%	96,4%	97,6%
Twist	98,9%	100%	97,5%	100%



**Before**  
secondary descaling



**After**  
secondary descaling

- **Smoothly structured roller surface without scale pits or scale patterns**
- ➔ **In combination with restricted chamber tolerance, an optimal alternative to drawn profile designs**

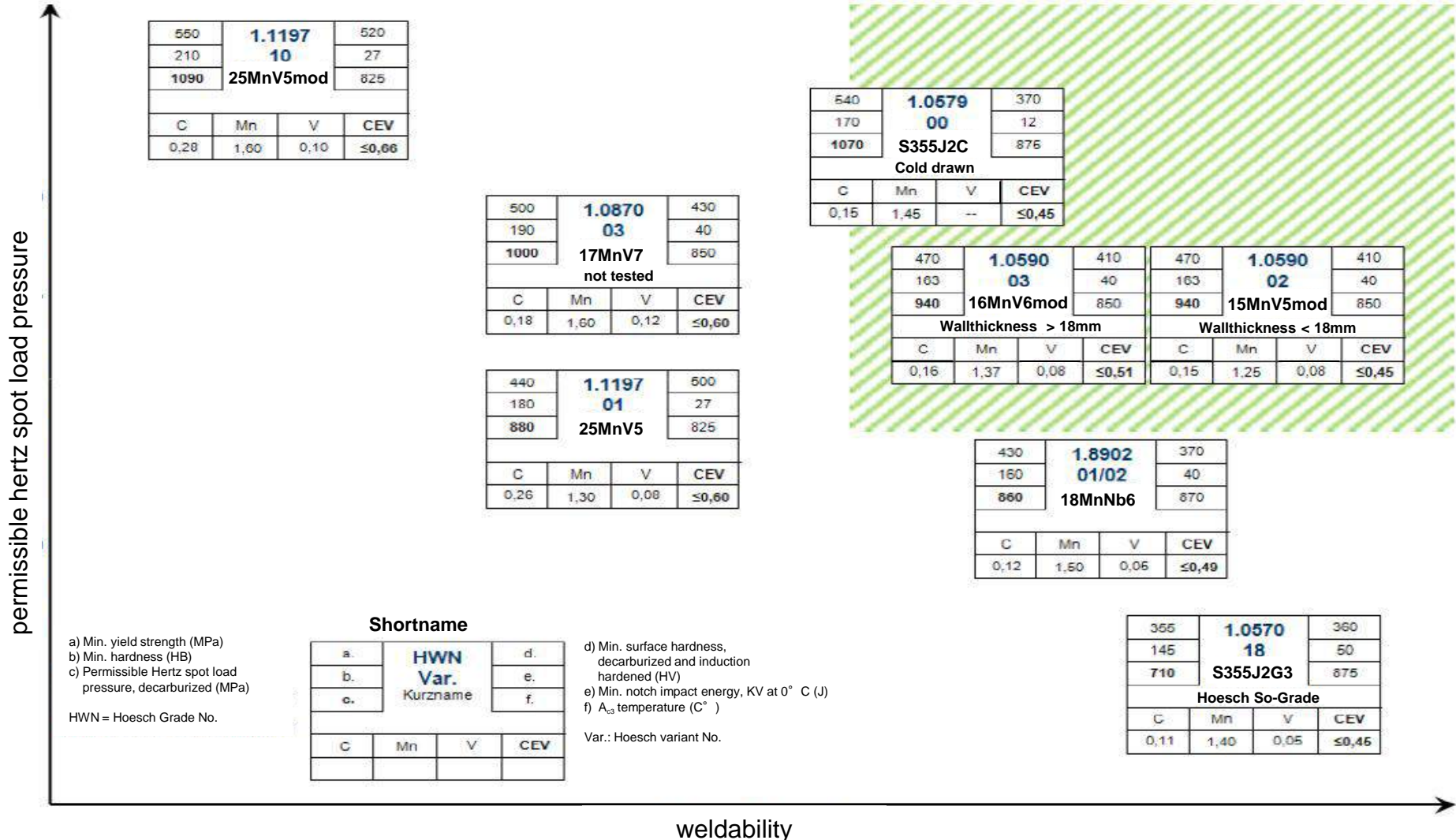


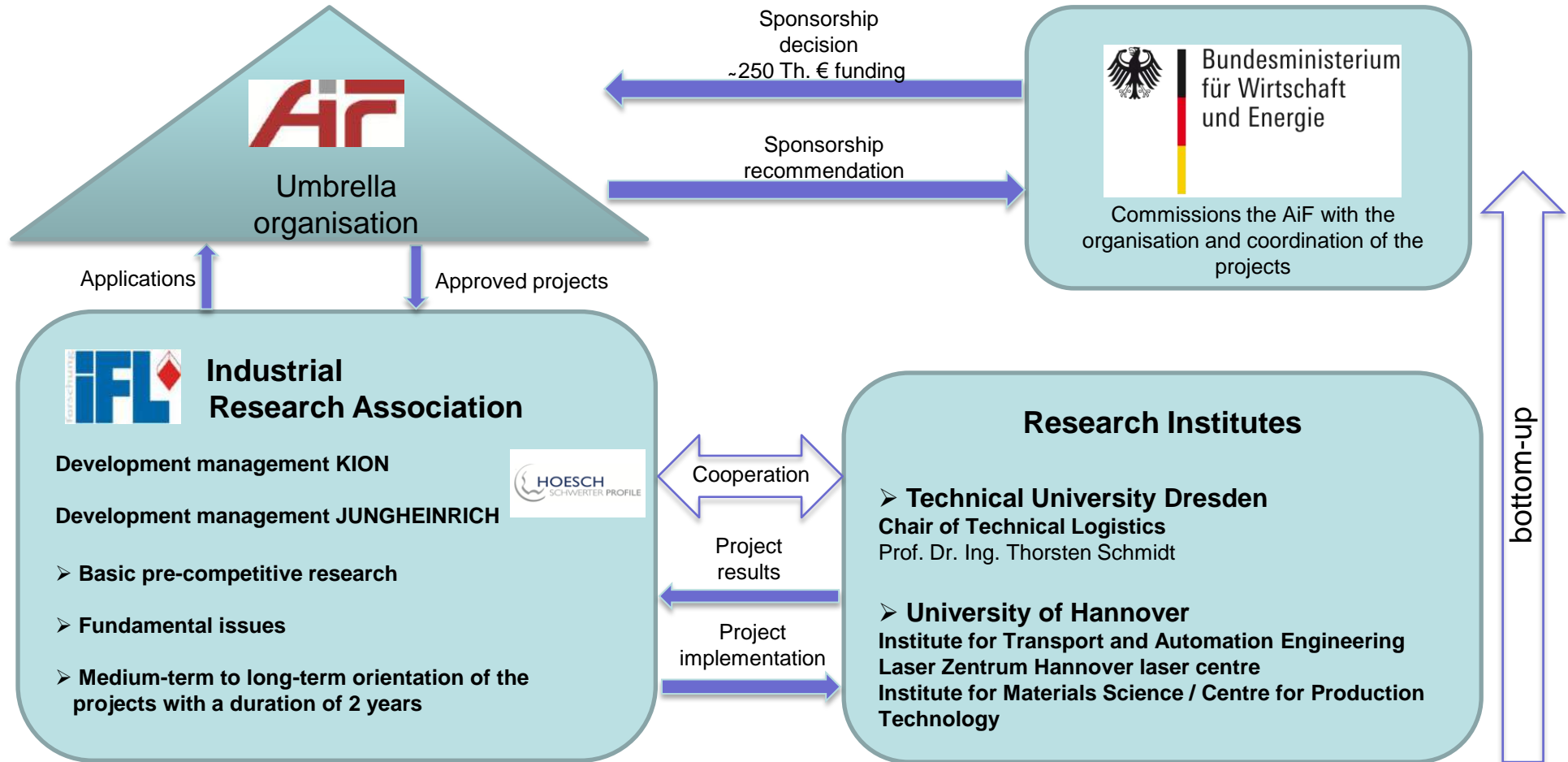
# Steel Grades

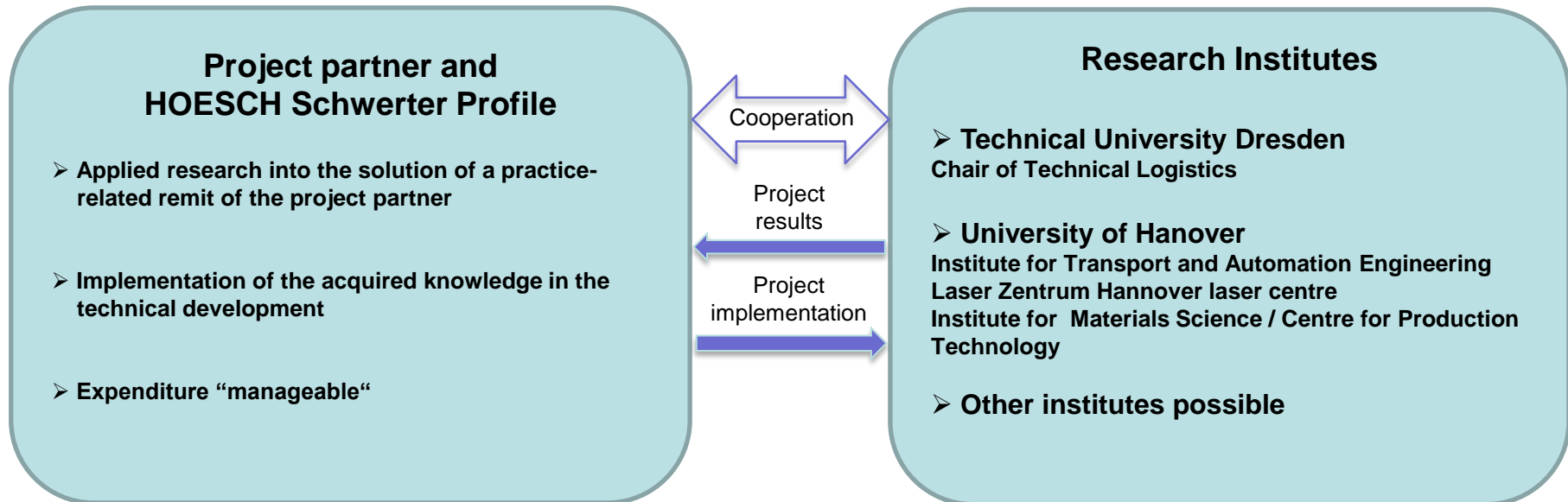
## Spot load pressure / weldability

### forklift truck steel grades

### Target area of the material properties







***- Hi-Tech, Non-contact Profile Measurement Systems for In-Line Use of hot rolled profile measurement -***



# Inline profile measurement of hot rolled profiles

## Significant advantages

- faster start-ups, especially for new profiles
- continuous controlling process with documentation
- low scrap and higher level of product quality
- higher transparency of all processes
- automatic documentation / reporting under consideration of all monitored datas
- Elimination of sampling inspection / manual inspection
- Measurement of all kind of cross sections by using 8 cameras
- high scan rate with 200/sec.
- precise measurement up to  $\pm 0,01$  mm

