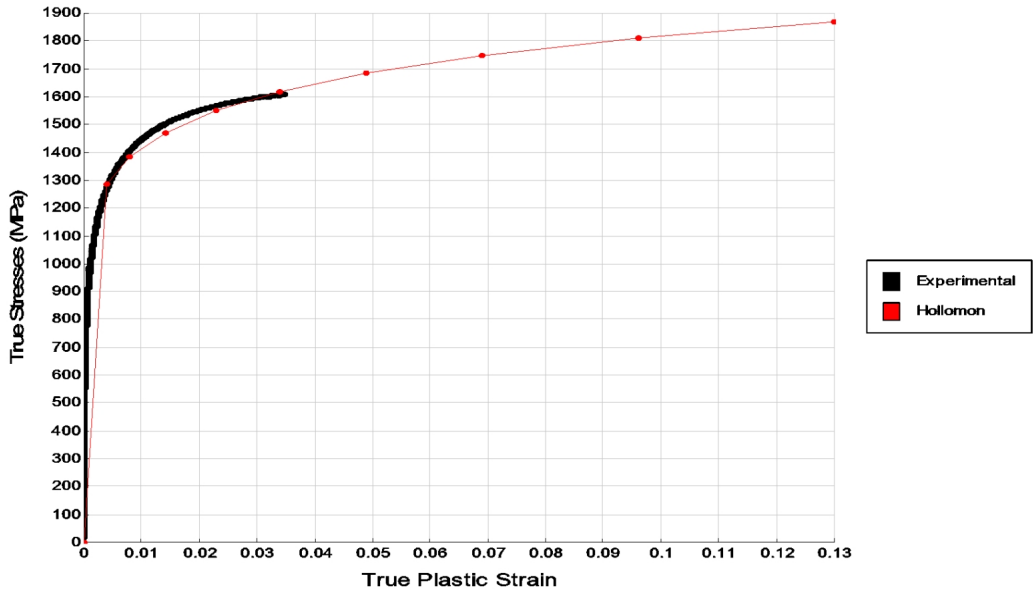
Stress-Strain Curves

Hot forming Steels - Usibor® 1500 treated

Thickness (mm)	1
Coating	AS150

Hollomon law



Parameters identified between 0.4 and 3.6 %

K (MPa)	2330
n	0.11

$$\sigma = K\varepsilon^{n}$$

Test conditions

Test direction	90°
Test Type	Uniaxial Tensile Test
Test procedure	NF EN ISO 6892-1
Procedure to determine "n"	ISO 10275
Procedure to determine "r"	ISO 10113
Sample geometry (b0xL0)	20*80
Gauge length (mm)	80

Test temperature	Room Temperature
Initial width of the calibrated zone (mm)	20.0
Initial thickness (mm)	1.12
Loading rate (MPa/s)	23
Strain rate before yielding (/s)	0.0025
Strain rate after yielding (/s)	0.008

Engineering properties

Ultimate Tensile Strength (MPa)	1553
Upper Yield Stress (MPa)	-
Lower Yield Stress (MPa)	-
Proof stress (MPa)	1141

Ae (%)	-
Ag (%)	3.6
A (%)	4.6
n (3% - 20%/Ag%)	0.04
r (3% - 20%/Ag%)	0.91

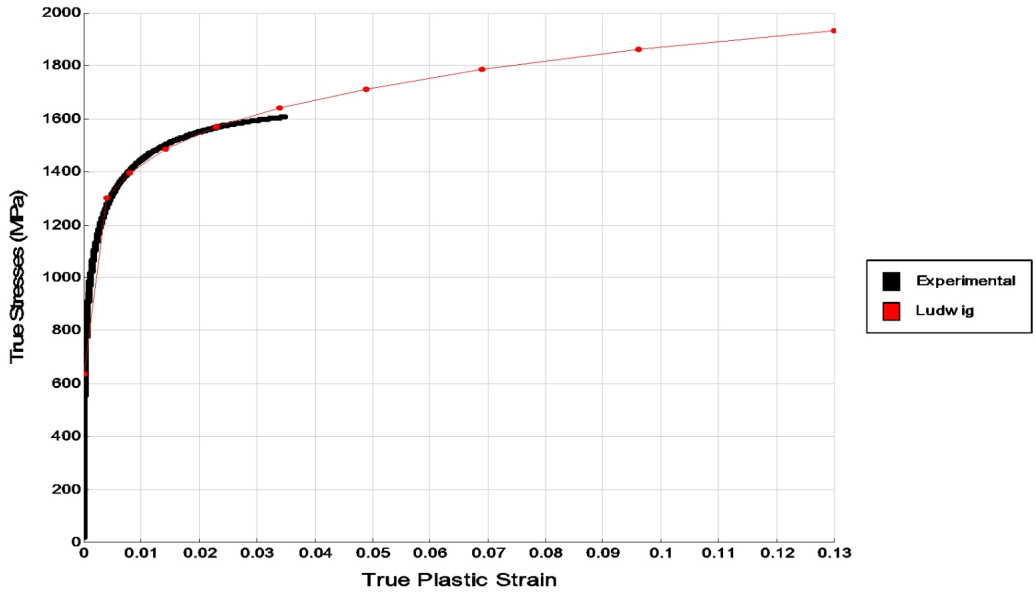
Rheo-TU-1518

Stress-Strain Curves

Hot forming Steels - Usibor® 1500 treated

Thickness (mm)	1
Coating	AS150

Ludwig law



Parameters identified between 0.4 and 3.6 %

σ_0 (MPa)	637
K (MPa)	1917
n	0.19

$$\sigma = \sigma_0 + K\varepsilon^n$$

Test conditions

Test direction	90°
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Test procedure	NF EN ISO 6892-1
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Procedure to determine "r"	ISO 10113
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Engineering properties

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Ag (%)	3.6
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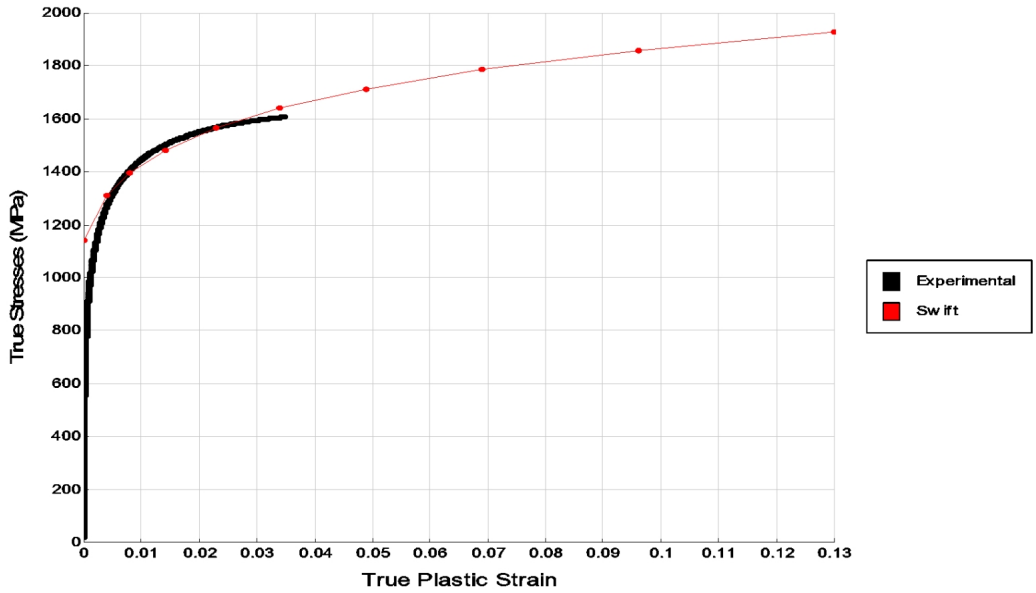
Rheo-TU-1518

Stress-Strain Curves

Hot forming Steels - Usibor® 1500 treated

Thickness (mm)	1
Coating	AS150

Swift law



Parameters identified between 0.4 and 3.6 %

ε0	0.0020
K (MPa)	2486
n	0.13

$$\sigma = K(\varepsilon_0 + \varepsilon)^n$$

Test conditions

Test direction	90°
Test Type	Uniaxial Tensile Test
Test procedure	NF EN ISO 6892-1
Procedure to determine "n"	ISO 10275
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Sample geometry (b0xL0)	20*80
Gauge length (mm)	80

Test temperature	Room Temperature
Initial width of the calibrated zone (mm)	20.0
Initial thickness (mm)	1.12
Loading rate (MPa/s)	23
Strain rate before yielding (/s)	0.0025
Strain rate after yielding (/s)	0.008

Engineering properties

Ultimate Tensile Strength (MPa)	1553
Upper Yield Stress (MPa)	-
Lower Yield Stress (MPa)	-
Proof stress (MPa)	1141

Ae (%)	-
Ag (%)	3.6
A (%)	4.6
n (3% - 20%/Ag%)	0.04
r (3% - 20%/Ag%)	0.91

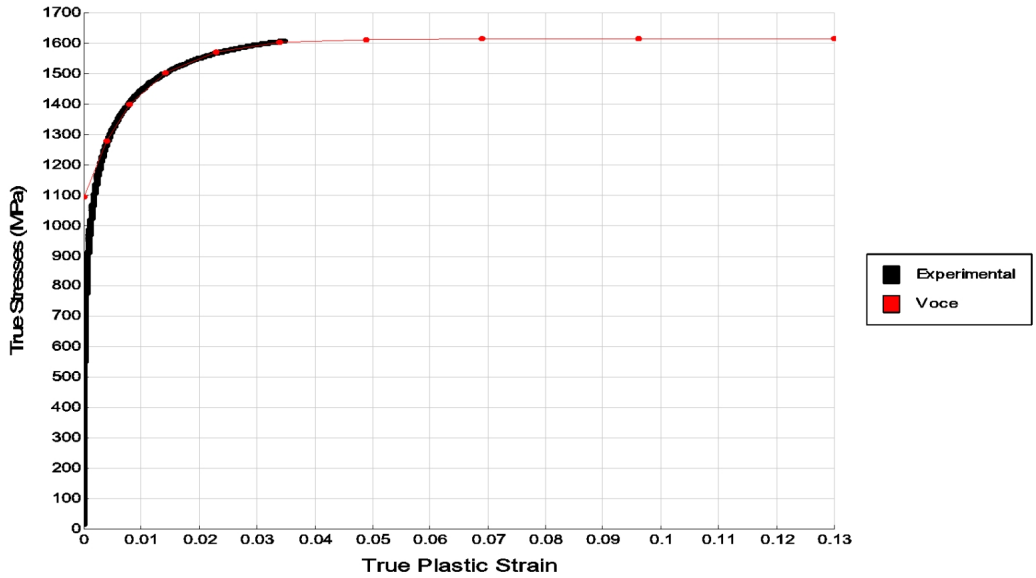
Rheo-TU-1518

Stress-Strain Curves

Hot forming Steels - Usibor® 1500 treated

Thickness (mm)	1
Coating	AS150

Voce law



Parameters identified between 0.4 and 3.6 %

σ_0 (MPa)	1096	m	109.23
σ_{sat} (MPa)	520		

$$\sigma = \sigma_0 + \sigma_{sat}\left(1 - \exp\left(-m\varepsilon\right)\right)$$

Test conditions

Test direction	90°	Test temperature	Room Temperature
Test Type	Uniaxial Tensile Test	Initial width of the calibrated zone (mm)	20.0
Test procedure	NF EN ISO 6892-1	Initial thickness (mm)	1.12
Procedure to determine "n"	ISO 10275	Loading rate (MPa/s)	23
Procedure to determine "r"	ISO 10113	Strain rate before yielding (/s)	0.0025
Sample geometry (b0xL0)	20*80	Strain rate after yielding (/s)	0.008
Gauge length (mm)	80		

Engineering properties

Ultimate Tensile Strength (MPa)	1553	Ae (%)	-
Upper Yield Stress (MPa)	-	Ag (%)	3.6
Lower Yield Stress (MPa)	-	A (%)	4.6
Proof stress (MPa)	1141	n (3% - 20%/Ag%)	0.04
		r (3% - 20%/Ag%)	0.91

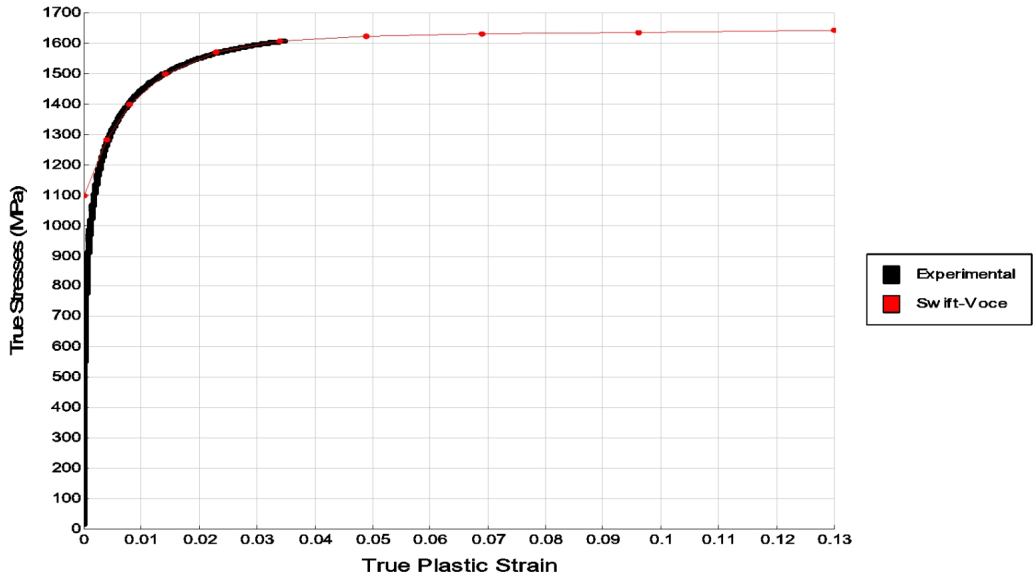
Rheo-TU-1518

Stress-Strain Curves

Hot forming Steels - Usibor® 1500 treated

Thickness (mm)	1
Coating	AS150

Swift-Voce law (Recommended model)



Parameters identified between 0.4 and 3.6 %

ε_0	0.0020	σ_{sat} (MPa)	520
K (MPa)	2486	m	109.23
n	0.13	α	0.91
σ_0 (MPa)	1096		

$$\sigma = (1-\alpha)K(\varepsilon+\varepsilon_0)^n + \alpha\left(\sigma_0 + \sigma_{sat}(1-\exp(-m\varepsilon))\right)$$

Test conditions

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