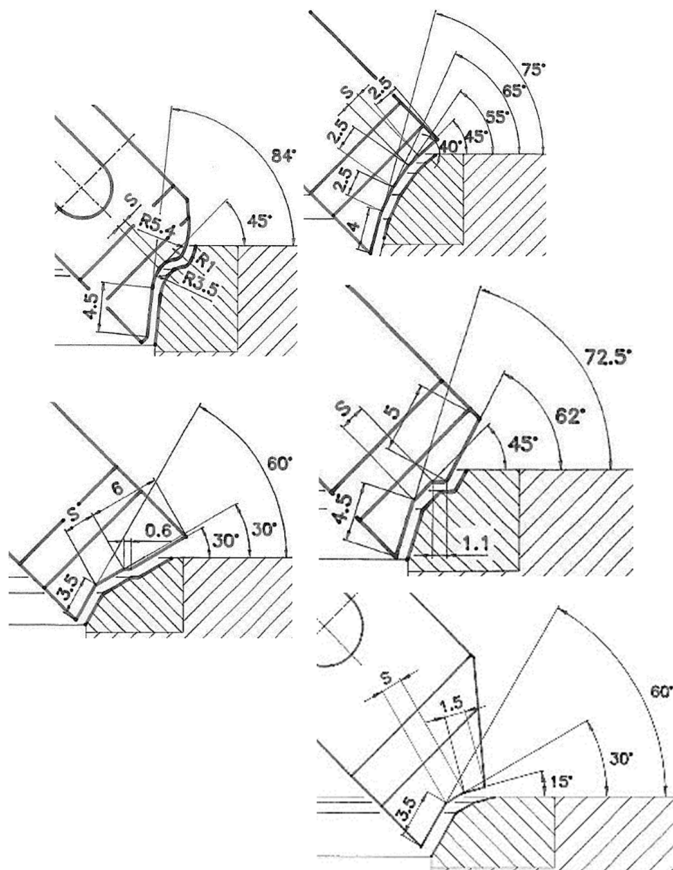


MIRA®

Formtools and Pilots
Formstähle und
Führungsdorne
Outils de façon et pilotes
Skärstal och Styrspindlar
Utensili e pilote
Cuchillas y pilotos



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1 Introduction

Thanks to their profiled carbide tip, **mira** formtools allow a quick processing of the entire valve seat profile in one working cycle. **mira** offers you the largest range of formtools in various shapes, with seat widths from 0.5 to 8.0 mm and seat angles of 45° and 30°, in two qualities ("normal" and "X" for extremely hard valve seats) and with 4 different holder types.

All formtools which are available from stock are listed in this catalogue.

The respective drawings of formtools are shown on pages 16 - 33, assorted by seat angle and seat width.

mira can also offer special priced custom made formtools on request. Orders for special formtools may be placed by filling-in the order form included in this catalogue. You will find the required information in the corresponding vehical manual. Any missing information must be established from the appropriate cylinder head or are available with the general dealer.

To determine the size of holder, please consider the valve seat diameter and the different types of tool-heads (refer to the following pages).

1 Einleitung

mira Formstähle ermöglichen dank ihrer profilierten Hartmetallschneide eine schnelle Bearbeitung des gesamten Ventilsitzprofils in einem Arbeitsgang. **mira** bietet Ihnen das grösste Sortiment an Formstählen in verschiedenen Formen, mit Sitzbreiten von 0.5 - 8.0 mm, Sitzwinkel von 45° und 30° und zwei Qualitäten ("normal" und "X" für besonders harte Ventilsitze) sowie mit 4 verschiedenen Haltertypen.

Alle ab Lager erhältlichen Formstähle sind in diesem Katalog aufgelistet.

Die entsprechende Formstahl-Zeichnung finden Sie auf den Seiten 16 - 33, sortiert nach Sitzwinkel und Sitzbreite.

Nebst diesen Formstählen sind auf Anfrage auch Spezialformstähle erhältlich, welche zu einem Spezialpreis hergestellt werden. Für Bestellungen von Spezialanfertigungen füllen Sie bitte das Bestellformular in diesem Katalog aus. Die benötigten Daten finden Sie im Handbuch des entsprechenden Fahrzeuges. Fehlende Angaben sind bei Ihrem Generalimporteur erhältlich oder müssen am Zylinderkopf ausgemessen werden.

Für die Bestimmung des Halter-Typs sind der Ventilsitzdurchmesser sowie die verschiedenen Drehkopftypen zu berücksichtigen (siehe folgende Seiten).

1 Introduction

*Grâce à leur lame profilée en métal dur, les outils de façonnage **mira** permettent l'usinage rapide des sièges de soupape, en une seule passe. **mira** vous propose un immense assortiment d'outils de façonnage de diverses formes, avec des largeurs de siège de 0.5 à 8.0 mm et des angles de siège de 45° ou 30°, en deux Qualités ("normale" et "X", pour les sièges de soupape particulièrement durs), et avec 4 divers types de support.*

Tous les outils de façonnage disponibles sur stock sont énumérés dans le présent catalogue.

Vous trouverez les dessins correspondants aux pages 16 à 33, classés selon les angles et les largeurs de siège.

Outre les outils ci-dessus, des outils de façonnage spéciaux, fabriqué à des prix eux aussi spéciaux, sont disponibles sur demande. Pour la commande de versions spéciales, nous vous prions de remplir le formulaire inclus dans ce catalogue. Vous trouverez les données nécessaires dans le manuel de véhicule correspondant. Les données manquantes seront disponibles auprès de votre importateur général, ou bien vous devrez les mesurer sur la culasse.

Pour déterminer le type de support, il faudra tenir compte de diamètre de sièges de soupape ainsi que des divers types de têtes tournantes (voir les pages suivantes).

2 Formtools and lettering of Formtools

2 Formstähle

2 Outils de façon

2 Skärstål

2 Utensil ad angolazione multipla

2 Cuchillas de mandrinado moldeada

α
Seat angle
Sitzwinkel
Angle de siège
Sätessvinkel
Angolo di sede
Angulo del asiento

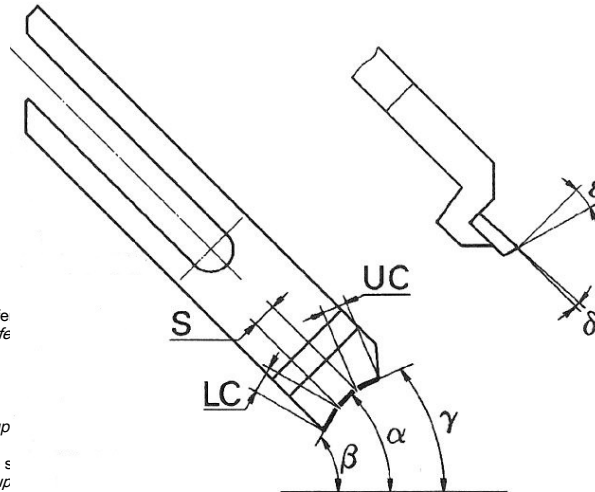
β
Lower correction angle
Unterer Korrekturwinkel
Angle de dégagement inférieur
Inre korrektionsvinkel
Angolo di correzione inferiore

γ
Upper correction angle
Oberer Korrekturwinkel
Angle de dégagement supérieur
Yttre korrektionsvinkel
Angolo di correzione superiore

S
Seat width
Sitzbreite
Largeur de siège
Sätessbredd
Larghezza di sede
Largura del'

LC
Lower correction length
Unterer Korrekturlänge
Largeur du dégagement inférieure
Inre korrektionsbredd
Larghezza di correzione infe
Largura de la corrección inf

UC
Upper correction length
Obere Korrekturlänge
Largeur du dégagement sup
Yttre korrektionsbredd
Larghezza della correzione s
Largura de la corrección sup



ϵ Typ A+B+DT=10°; Typ C=15°
Clearance angle
Freiwinkel
Dépouille
Släppingsvinkel
Angolo di spoglia inferiore
Despojo

$\delta=3^\circ$
Cutting angle
Schnittwinkel
Angle de coupe
Skärvinkel
Angolo di spoglia anteriore

3 Lettering of Formtools

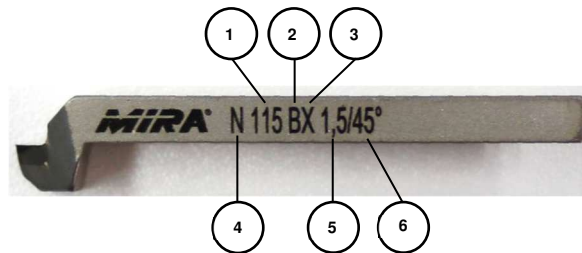
3 Beschriftung der Formstähle

3 Inscription des outils de façon

3 Märkning av Skärsål

3 Dicitura degli utensili ad angolazione multipla

3 Denominación de las cuchillas de mandrinado moldeadas



1	Formtool No.	Formstahlnummer	Nombre d'outil	Skärstålnummer	Numero del l'utensile	Número de la cuchilla
2	Formtool model A – normal diameter B – bigger diameter C – only little diameter DT – only DT3 tool-head for biggest diameter	Formstahltyp	Modèle de l'outil	Skärståltyp	Tipo d'utensile	Modelo de la cuchilla
3	Carbide tool bit -no indication = normal quality -X indication = special quality	Hartmetall	Métal dur	Hårdmetall	Metallo duro	Metal duro
4	Internal term (not necessary for customer)	Interne Bezeichnung (nicht notwendig für den Kunden)	Nom interne (pas nécessaire pour le Client)	Intern namn (inte nödvändigt för kunden)	Nome interno (non necessario per il cliente)	Nombre interno (no es necesario para el cliente)
5	Seat width in mm	Sitzbreite in mm	Largeur du siège en mm	Sätessbredd i mm	Larghezza di sede in mm	Largura del asiento in mm
6	Seat angle in °	Sitzwinkel in °	Angle de siège en °	Sätessvinkel i °	Angolo di sde in °	Angulo del asiento in °

4 Order Form for Mira Formtools
4 Bestellformular für Mira-Formstähle
4 Bulletin de commande pour outils Mira

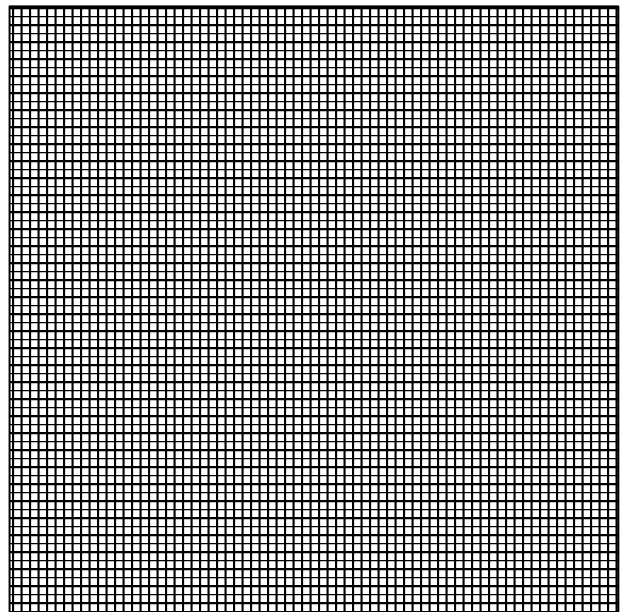
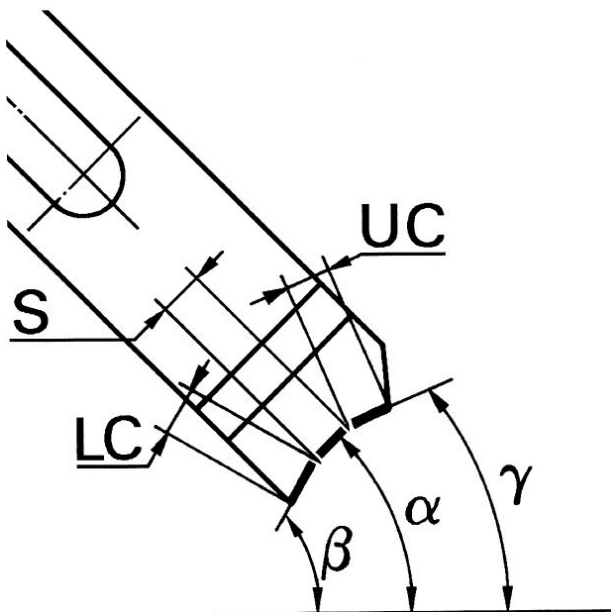
Local dealer: _____ Name: _____ Date of purchase: _____

Information needed about the Vehicle:

Mark: _____ Vehicle: _____ Year: _____
 Engine type: _____ Fuel/ Diesel: _____ Volume (ccm): _____

Information needed about the cylinderhead:

	<u>Inlet Valve:</u>				<u>Outlet Valve:</u>			
Seat width in mm:	S	=	_____	S	=	_____		
Seat angle in °:	α	=	_____	α	=	_____		
Upper correction length in mm:	UC	=	_____	UC	=	_____		
Upper correction angle in °:	γ	=	_____	γ	=	_____		
Lower correction length in mm:	LC	=	_____	LC	=	_____		
Lower correction angle in °:	β	=	_____	β	=	_____		
Valveguide:	\emptyset	=	_____	\emptyset	=	_____		
Carbide tool bit (normal or X)	N <input type="checkbox"/>	X <input type="checkbox"/>		N <input type="checkbox"/>	X <input type="checkbox"/>			
Holder type (valve- \emptyset)	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	DT <input type="checkbox"/>	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	DT <input type="checkbox"/>



Please fill in this completely, this assures a prompt delivery without delays because of further information needed in production and also helps us to update our formtool list. If the requested formtool is very different from the one above, please fill in a drawing or add a copy of the manual.

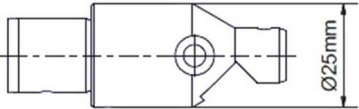
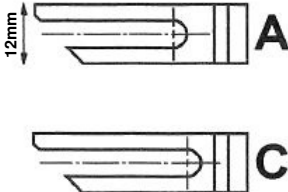

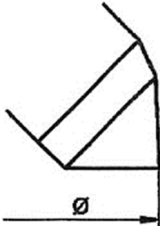
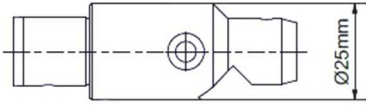
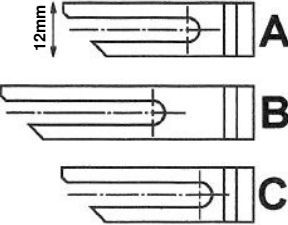
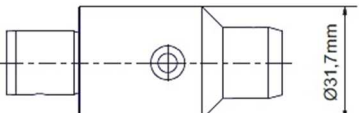
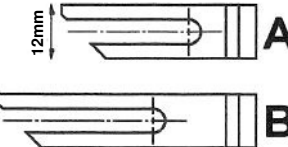
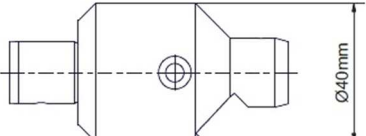
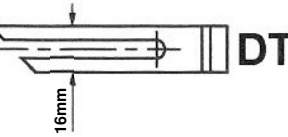
Manufacturer and worldwide distributor:

MINELLI CORPORATION
 8330 Pfäffikon/ ZH
 Switzerland

Phone: +41 952 35 35

Fax: +41 952 35 60

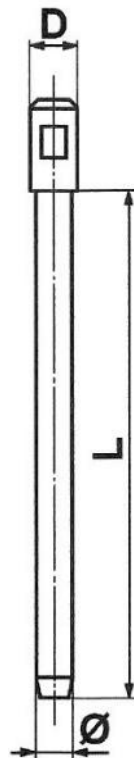
- 5 **Tool-heads and types of formtools**
- 5 **Drehköpfe und Formstahltypen**
- 5 **Têtes porte-outils et modèles d'outils**
- 5 **Skärhuvuden och Skärstålmodeller**
- 5 **Teste porta-utensili e Tipi d'utensili**
- 5 **Cabezales mandinadores y Modelos de cuchilla**

<p>Spindle size Drehkopf-Grösse Modèle de broche Storlek skärhuvud Modello testa porta-utensili Talla del cabezal mandrinador</p>	<p>Formtool model Formstahl-Typ Modèle de l'outil Skärståltyp Tipo d'utensile Modelo de la cuchilla</p>	<p>Processing-Ø (formtool 115) Bearbeitungs-Ø (Formstahl 115) Ø d'usinage (outil 115) Bearbetnings Ø (Skärstål 115) Ø di lavorazione (utensile 115) Ø de labra (cuchilla 115)</p>	<p>Processing-Ø ring seating tool 390 Bearbeitungs-Ø Ringsitzstahl 390 Ø d'usinage por un acier 390 Bearbetnings Ø Stål för ringsäten 390 Ø di lavorazione per un acciaio 390 Ø de labra por un acero 390</p>
<p>DT05 / (DRC05) suitable for FDM, FDMH pilots</p> 		 <p>20 to / bis / à 35 16 to / bis / à 30</p>	 <p>23 to / bis / à 38 21 to / bis / à 34</p>
<p>DT1 / (DRC1) suitable for FD pilots</p>  <p>(Standard model/ VGX-21) (Standardtyp/ VGX-21) (Modèle standard/ VGX-21)</p>		<p>23 to / bis / à 36 31 to / bis / à 45 21 to / bis / à 33</p>	<p>28 to / bis / à 38 34 to / bis / à 48 25 to / bis / à 35 DSD Ø35 - 45</p>
<p>DT2 / (DRC2) suitable for FD pilots</p> 		<p>37 to / bis / à 42 38 to / bis / à 55</p>	<p>42 to / bis / à 48 42 to / bis / à 58 DSD Ø45 - 55</p>
<p>DT3 suitable for FD pilots</p> 		<p>35 to / bis / à 75</p>	<p>DSD Ø55 - 75</p>

- 6 Pilots
- 6 Führungsdorne
- 6 *Pilotes*
- 6 *Styrspindlar*
- 6 Piloti
- 6 *Pilotos*

Plug-in Pilots

Suitable for DT-, DRC-tool-head models



FD	\varnothing 5.87 – 9.20 D= \varnothing 9.52 L= 100
FD	\varnothing 9.30 – 16.00 D= \varnothing 9.52 L= 138
FDM	\varnothing 3.49 – 6.02 D= \varnothing 6.00 L= 80
FDMH	sintered carbide type only available on request

7 mira formtool list
7 mira Formstahlliste
7 mira list des outils de façon

Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2.Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
105C	0.5/45°	0.50	45°30'	3°	15°	60°	3.5	25°	1.5			17
107C	0.7/45°	0.70	45°30'	3°	15°	60°	3.5	25°	1.5			17
108A	0.8/45°	0.80	45°30'	3°	10°	60°	3.5	25°	1.5			17
108B	0.8/45°	0.80	45°30'	3°	10°	60°	3.5	25°	1.5			17
108C	0.8/45°	0.80	45°30'	3°	15°	60°	3.5	25°	1.5			17
108CX	0.8/45°	0.80	45°30'	3°	15°	60°	3.5	25°	1.5			17
110A	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
110AX	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
110B	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
110BX	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
110C	1.0/45°	1.00	45°30'	3°	15°	60°	3.5	25°	1.5			17
110CX	1.0/45°	1.00	45°30'	3°	15°	60°	3.5	25°	1.5			17
115A	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	25°	1.5			16
115AX	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
115B	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
115BX	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
115C	1.5/45°	1.50	45°30'	3°	15°	60°	3.5	25°	1.5			17
115CX	1.5/45°	1.50	45°30'	3°	15°	60°	3.5	25°	1.5			17
115DT	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
120A	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			16
120AX	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
120B	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
120BX	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
120CX	2.0/45°	2.00	45°30'	3°	15°	60°	3.5	25°	1.5			17
120DT	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
120DTX	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
125A	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
125AX	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
125B	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			16
125BX	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
125DT	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
125DTX	2.5/45°	2.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
130B	3.0/45°	3.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
130BX	3.0/45°	3.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
135B	3.5/45°	3.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
135DT	3.5/45°	3.50	45°30'	3°	10°	60°	3.5	25°	1.5			17
140B	4.0/45°	4.00	45°30'	3°	10°	60°	3.5	25°	1.5			17
208C	0.8/30°	0.80	30°30'	3°	15°	60°	3.5	15°	1.5			27
210A	1.0/30°	1.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
210AX	1.0/30°	1.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
210B	1.0/30°	1.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
210BX	1.0/30°	1.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
210C	1.0/30°	1.00	30°30'	3°	15°	60°	3.5	15°	1.5			27
212B	1.2/30°	1.20	30°30'	3°	10°	60°	3.5	15°	1.5			27
215A	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	15°	1.5			26

Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
215AX	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
215B	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
215BX	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
215C	1.5/30°	1.50	30°30'	3°	15°	60°	3.5	15°	1.5			27
215CX	1.5/30°	1.50	30°30'	3°	15°	60°	3.5	15°	1.5			27
215DT	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
220A	2.0/30°	2.00	30°30'	3°	10°	60°	3.5	15°	1.5			26
220AX	2.0/30°	2.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
220B	2.0/30°	2.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
220BX	2.0/30°	2.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
220DT	2.0/30°	2.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
225B	2.5/30°	2.50	30°30'	3°	10°	60°	3.5	15°	1.5			26
225BX	2.5/30°	2.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
225DT	2.5/30°	2.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
230B	3.0/30°	3.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
230BX	3.0/30°	3.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
230DT	3.0/30°	3.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
235B	3.5/30°	3.50	30°30'	3°	10°	60°	3.5	15°	1.5			27
240B	4.0/30°	4.00	30°30'	3°	10°	60°	3.5	15°	1.5			27
301A	45°	9.00	45°30'	3°	10°							32
301AX	45°	9.00	45°30'	3°	10°							32
301B	45°	9.00	45°30'	3°	10°							32
301BX	45°	9.00	45°30'	3°	10°							32
301C	45°	9.00	45°30'	3°	15°							32
301CX	45°	9.00	45°30'	3°	15°							32
301DT	45°	13.00	45°30'	3°	10°							32
302A	30°	9.00	30°30'	3°	10°							32
302AX	30°	9.00	30°30'	3°	10°							32
302B	30°	9.00	30°30'	3°	10°							32
302BX	30°	9.00	30°30'	3°	10°							32
302C	30°	9.00	30°30'	3°	15°							32
302CX	30°	9.00	30°30'	3°	15°							32
302DT	30°	9.00	30°30'	3°	10°							32
303B	35°	10.00	35°30'	3°	10°							32
303BX	35°	10.00	35°30'	3°	10°							32
304B	45°	12.00	45°30'	3°	10°							32
304BX	45°	12.00	45°30'	3°	10°							32
305B	30°	12.00	30°30'	3°	10°							32
305BX	30°	12.00	30°30'	3°	10°							32
306A	20°	7.50	20°30'	3°	10°							32
306B	20°	7.50	20°30'	3°	10°							32
306BX	20°	7.50	20°30'	3°	10°							32
306DT	20°	7.50	20°30'	3°	10°							32
351A	75°			3°	10°	75°	14.0					32
351B	75°			3°	10°	75°	14.0					32
351BX	75°			3°	10°	75°	14.0					32
351C	75°			3°	15°	75°	14.0					32
351CX	75°			3°	15°	75°	14.0					32
352A	15°			3°	10°			15°	9.5			33
352B	15°			3°	10°			15°	9.5			33
352BX	15°			3°	10°			15°	9.5			33

Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
352DT	15°			3°	10°			15°	9.5			33
353A	75°			3°	10°	75°	7.0					32
353B	75°			3°	10°	75°	7.0					32
354B	15°			3°	10°			15°	4.0	R7.0		33
355B	38°			3°	10°			38°	6.5	R5.4		33
357B	39°			3°	10°			39°	2.0	R6.5		33
358B				3°	10°	R27.5						32
360B	25°			3°	10°			25°	9.5			33
362A	60°			3°	10°	60°	11.0					32
362B	60°			3°	10°	60°	11.0					32
363B	80°			3°	10°							33
365A	85°			3°	10°	85°	12.0					32
365B	85°			3°	10°	85°	12.0					32
390A		8.00	0°0'	3°	10°							33
390AX		8.00	0°0'	3°	10°							33
390B		8.00	0°0'	3°	10°							33
390BX		8.00	0°0'	3°	10°							33
390C		8.00	0°0'	3°	15°							33
390CX		8.00	0°0'	3°	15°							33
390DT		8.00	0°0'	3°	10°							33
4001A	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	0°	1.5			18
4002A	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	0°	1.5			21
4003A	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	0°	1.5			22
4003B	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	0°	1.5			22
4004A	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	30°	1.5			18
4004B	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	30°	1.5			18
4005A	1.5/45°	1.50	45°30'	3°	10°	55°	3.5	30°	1.5			21
4005AX	1.5/45°	1.50	45°30'	3°	10°	55°	3.5	30°	1.5			21
4005B	1.5/45°	1.50	45°30'	3°	10°	55°	3.5	30°	1.5			21
4005BX	1.5/45°	1.50	45°30'	3°	10°	55°	3.5	30°	1.5			21
4006A	2.0/45°	2.00	45°30'	3°	10°	55°	3.5	30°	1.5			22
4006AX	2.0/45°	2.00	45°30'	3°	10°	55°	3.5	30°	1.5			22
4006B	2.0/45°	2.00	45°30'	3°	10°	55°	3.5	30°	1.5			22
4006BX	2.0/45°	2.00	45°30'	3°	10°	55°	3.5	30°	1.5			22
4009A	6.0/45°	6.00	45°30'	3°	10°	60°	3.5					25
4010B	2.8/45°	2.80	45°30'	3°	10°	60°	3.5	0°	0.3	45°	5.5	24
4011B	4.2/45°	4.20	45°30'	3°	10°	60°	2.5	0°	0.7	45°	5.0	24
4012B	2.0/45°	2.00	45°30'	3°	10°	60°	2.5	0°	0.7	60°	7.0	23
4015B	3.0/45°	3.00	45°30'	3°	10°	60°	3.5	R0.6				24
4016B	3.5/45°	3.50	45°30'	3°	10°	60°	3.5	R0.6				24
4018B	1.5/45°	1.50	45°30'	3°	10°	70°	4.0	0°	0.4	45°	7.0	21
4020A	1.5/45°	1.50	45°30'	3°	10°	65°	3.5	R2.0				21
4021A	1.7/45°	1.70	45°30'	3°	10°	65°	3.5	R2.0				22
4022B	1.7/45°	1.70	45°30'	3°	10°	60°	5.0	0°	0.8			22
4023B	5.0/45°	5.00	45°30'	3°	10°	60°	4.5					24
4025B	2.0/45°	2.00	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		23
4025BX	2.0/45°	2.00	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		23
4027B	2.0/45°	2.00	45°30'	3°	10°	60°	6.0	0°	1.0	60°	2.5	23
4028B	3.0/45°	3.00	45°30'	3°	10°	60°	6.0	0°	1.0	60°	2.5	24
4029A	1.0/45°	1.00	45°30'	3°	10°	R12		15°	2.0			18
4029B	1.0/45°	1.00	45°30'	3°	10°	R12		15°	2.0			18

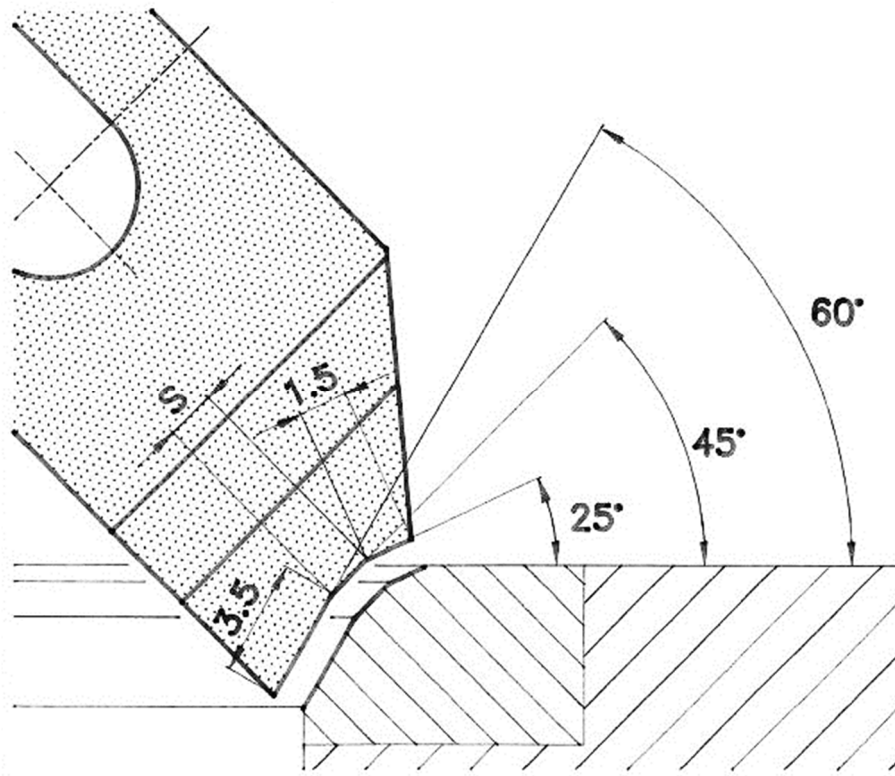
Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
4030B	1.3/45°	1.30	45°30'	3°	10°	65°	3.5	38°	2.5	R1.5		20
4030BX	1.3/45°	1.30	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		20
4030C	1.3/45°	1.30	45°30'	3°	15°	65°	3.5	38°	2.6	R1.5		20
4032A	1.0/45°	1.00	45°30'	3°	10°	75°	7.0	15°	2.3	R0.7		18
4033B	1.5/45°	1.50	45°30'	3°	10°	60°	3.0	30°	3.2			21
4034B	2.0/45°	2.00	45°30'	3°	10°	72.5°	4.5	0°	1.1	62°	5.0	23
4036A	1.2/45°	1.20	45°30'	3°	10°	60°	5.0	15°	2.0			20
4036B	1.2/45°	1.20	45°30'	3°	10°	60°	5.0	15°	2.0			20
4036BX	1.2/45°	1.20	45°30'	3°	10°	60°	5.0	15°	2.0			20
4037A	1.0/45°	1.00	45°30'	3°	15°	53°	3.5	35°	1.5			18
4037AX	1.0/45°	1.00	45°30'	3°	10°	53°	3.5	35°	1.5			18
4037B	1.0/45°	1.00	45°30'	3°	10°	53°	3.5	35°	1.5			18
4037BX	1.0/45°	1.00	45°30'	3°	10°	53°	3.5	35°	1.5			18
4037CX	1.0/45°	1.00	45°30'	3°	15°	53°	3.5	35°	1.5			18
4038A	1.5/45°	1.50	45°30'	3°	10°	53°	3.5	35°	1.5			21
4038AX	1.5/45°	1.50	45°30'	3°	10°	53°	3.5	35°	1.5			21
4038B	1.5/45°	1.50	45°30'	3°	10°	53°	3.5	35°	1.5			21
4038BX	1.5/45°	1.50	45°30'	3°	10°	53°	3.5	35°	1.5			21
4038C	1.5/45°	1.50	45°30'	3°	15°	53°	3.5	35°	1.5			21
4039B	2.0/45°	2.00	45°30'	3°	10°	53°	3.5	35°	1.5			23
4039BX	2.0/45°	2.00	45°30'	3°	10°	53°	3.5	35°	1.5			23
4040B	2.5/45°	2.50	45°30'	3°	10°	53°	3.5	35°	1.5			24
4041A	1.0/45°	1.00	45°30'	3°	10°	82°	R0.5	30°	1.7	R2.5		19
4041B	1.0/45°	1.00	45°30'	3°	10°	82°	R0.5	30°	1.7	R2.5		19
4042B	1.0/45°	1.00	45°30'	3°	10°	65°	5.5	32°	2.5			19
4043A	1.0/45°	1.00	45°30'	3°	10°	R12	3.0	35°	2.0	R1.0		19
4043B	1.0/45°	1.00	45°30'	3°	10°	R12	3.0	35°	2.0	R1.0		19
4043BX	1.0/45°	1.00	45°30'	3°	10°	R12	3.0	35°	2.0	R1.0		19
4045B	1.0/45°	1.00	45°30'	3°	10°	R5.0	2.5	40°	2.0			19
4046B	1.0/45°	1.00	45°30'	3°	10°	R5.0	4.0	40°	2.0			19
4047B	1.0/45°	1.00	45°30'	3°	10°	R12		40°	2.0			19
4048B	1.0/45°	1.00	45°30'	3°	10°	R12	3.5	40°	2.0			19
4050B	1.0/45°	1.00	45°30'	3°	10°	74°	7.0	35°	2.0			19
4052B	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	R6.0				21
4053B	1.5/45°	1.50	45°30'	3°	10°	53°	3.5	37°	1.7			21
4058B	1.5/45°	1.50	45°30'	3°	10°	60°	3.5	0°	0.7	60°	6.5	21
4060A	1.4/45°	1.40	45°30'	3°	10°	75°	3.5	32.5°	1.0	R5.0		21
4060B	1.4/45°	1.40	45°30'	3°	10°	75°	3.5	32.5°	1.0	R5.0		21
4061A	1.4/45°	1.40	45°30'	3°	10°	75°	3.5	32.5°	1.5	R6.0	R2.0	21
4063A	1.0/45°	1.00	45°30'	3°	10°	R6.0		R4.7				19
4063B	1.0/45°	1.00	45°30'	3°	10°	R6.0		R4.7				19
4064A	0.8/45°	0.80	45°30'	3°	10°	60°	4.5	32.5°	1.0	R5.0		18
4064B	0.8/45°	0.80	45°30'	3°	10°	60°	4.5	32.5°	1.0	R5.0		18
4064C	0.8/45°	0.80	45°30'	3°	15°	60°	4.5	32.5°	1.0	R5.0		18
4065B	1.2/45°	1.20	45°30'	3°	10°	65°	4.5	35°	1.5	R0.9		20
4072B	7.0/45°	7.00	45°30'	3°	10°	60°	4.0					25
4072BX	7.0/45°	7.00	45°30'	3°	10°	60°	4.0					25
4074A	1.5/45°	1.50	45°30'	3°	10°	R12		15°	2.0			22
4074B	1.5/45°	1.50	45°30'	3°	10°	R12		15°	2.0			22
4076B	1.3/45°	1.30	45°30'	3°	10°	R6.6	4.5	37.5°	2.0			20
4077B	1.3/45°	1.30	45°30'	3°	10°	55°	2.5	40°	2.5			20

Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
4080B	2.0/45°	2.00	45°30'	3°	10°	60°	3.5	0°	0.3			23
4081BX	2.0/45°	2.00	45°30'	3°	10°	55°	3.5	30°	4.0			23
4086B	1.0/45°	1.00	45°30'	3°	10°	65°	4.0	R6.0				19
4086C	1.0/45°	1.00	45°30'	3°	15°	65°	4.0	R6.0				19
4087B	1.2/45°	1.20	45°30'	3°	10°	65°	4.0	R6.0				20
4090C	1.3/45°	1.30	45°30'	3°	15°	65°	4.0	R6.3				20
4091A	3.0/45°	3.00	45°30'	3°	10°	75°	8.0					24
4092B	4.0/45°	4.00	45°30'	3°	10°	R10						24
4093B	3.0/45°	3.00	45°30'	3°	10°	60°	3.5	30°	1.5			24
4094B	1.2/45°	1.20	45°30'	3°	10°	70°	7.5	20°	1.1			20
4095B	1.0/45°	1.00	45°30'	3°	10°	R4.0	4.5	20°	2.0	R2.0		19
4096B	2.3/45°	2.30	45°30'	3°	10°	70°	6.0	0°	1.5			23
4098B	1.5/45°	1.50	45°30'	3°	10°	R12		40°	2.0			22
4099B	1.3/45°	1.30	45°30'	3°	10°	60°	3.5	30°	2.0			20
4100B	1.4/45°	1.40	45°30'	3°	10°	60°	4.0	35°	2.5			21
4101B	1.2/45°	1.20	45°30'	3°	10°	60°	3.5	35°	2.0			20
4102B	1.1/45°	1.10	45°30'	3°	10°	60°	3.5	38°	2.5			20
4104B	1.5/45°	1.50	45°30'	3°	10°	R12	3.0	35°	2.0	R1.0		22
4105B	2.0/45°	2.00	45°30'	3°	10°	R12	3.0	35°	2.0	R1.0		23
4107BX	2.5/45°	2.50	45°30'	3°	10°	75°	4.0	15°	3.0	R0.4		24
4109A	1.5/45°	1.50	45°30'	3°	10°	70°	5.0	0°	0.9			22
4110A	2.0/45°	2.00	45°30'	3°	10°	70°	5.0	0°	0.7			23
4111A	2.0/45°	2.00	45°30'	3°	10°	70°	5.0	0°	1.2			23
4112A	1.5/45°	1.50	45°30'	3°	10°	70°	5.0	0°	1.1			22
4120B	1.2/45°	1.20	45°30'	3°	10°	70°	4.5	30°	2.0			25
4121A	2.0/45°	2.00	45°30'	3°	10°	75°	7.0	15°	2.3	R0.7		23
4122BX	1.5/45°	1.50	45°30'	3°	10°	75°	6.0	15°	3.5			22
4129B	1.5/45°	1.50	45°30'	3°	10°	75°	5.0	15°	1.5			22
4130A	2.0/45°	2.00	45°30'	3°	10°	75°	5.0	15°	1.5			23
4130B	2.0/45°	2.00	45°30'	3°	10°	75°	5.0	15°	1.5			23
4131C	1.1/45°	1.10	45°30'	3°	15°	65°	4.0		1.5	R6.3		20
4132C	1.2/45°	1.20	45°30'	3°	15°	65°	4.0		1.5	R6.3		20
4135B	1.0/45°	1.00	45°30'	3°	10°	82°	7.0	20°	1.0			19
4136B	R1.5			3°	10°	82°	7.0	15°	1.0	R0.8		25
4138B	1.5/45°	1.50	45°30'	3°	10°	R5.0	4.0	30°	3.0	R1.0		22
4139BX	3.0/45°	3.00	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		24
4140B	1.7/45°	1.70	45°30'	3°	10°	60°	5.0	30°	1.5			22
4141B	0.8/45°	0.80	45°30'	3°	10°	R3.4	4.5	R2.6		45°	0.7	18
4142B	0.8/45°	0.80	45°30'	3°	10°	R3.5	4.5	R1.0		R5.4		18
4143B	0.8/45°	0.80	45°30'	3°	10°	R5.5	6.0	R2.2		45°	0.7	18
4144A	1.0/45°	1.00	45°30'	3°	10°	60°	7.0	30°	4.0			19
4144B	1.0/45°	1.00	45°30'	3°	10°	60°	7.0	30°	4.0			19
4146A	0.5/45°	0.50	45°30'	3°	10°	75°	4.5	30°	4.0	R0.7		18
4147A	1.3/45°	1.30	45°30'	3°	10°	75°	4.0	30°	2.0			20
4148A	1.3/45°	1.30	45°30'	3°	10°	75°	3.5	15°	1.0			21
4150B	3.5/45°	3.50	45°30'	3°	10°	65°	7.0	5°	2.0			24
4157B	1.3/45°	1.30	45°30'	3°	10°	R12		30°	2.5			21
4158B	4.5/45°	4.50	45°30'	3°	10°			0°	0.7	45°	7.0	24
4159B	5.5/45°	5.50	45°30'	3°	10°			0°	0.5	45°	6.0	24
4182A	0.8/45°	0.80	45°30'	3°	10°	65°	5.5	32°	2.5			18
4187A	2.0/45°	2.00	45°30'	3°	10°	70°	3.5	30°	1.5			23

Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
4188A	2.4/45°	2.40	45°30'	3°	10°	70°	3.5	30°	1.5			23
4203A	1.4/45°	1.40	45°30'	3°	10°	70°	3.3	30°	2.5	R0.5		21
4229B	0.85/45°	0.85	45°30'	3°	10°	R9.5	1.0	30°	2.0	R3.0		18
4229CX	0.85/45°	0.85	45°30'	3°	15°	R9.5	1.0	30°	2.0	R3.0		18
4231A	0.8/45°	0.80	45°30'	3°	10°	60°	3.5	30°	1.5			18
4231C	0.8/45°	0.80	45°30'	3°	15°	60°	3.5	30°	1.5			18
4232A	1.0/45°	1.00	45°30'	3°	10°	60°	3.5	30°	1.5			19
4232C	1.0/45°	1.00	45°30'	3°	15°	60°	3.5	30°	1.5			19
4232CX	1.0/45°	1.00	45°30'	3°	15°	60°	3.5	30°	1.5			19
4243A	1.5/45°	1.50	45°30'	3°	10°	67°	3.5	30°	1.5			22
4248A	1.0/45°	1.00	45°30'	3°	10°	R3.0	3.0	25°	1.0	R2.0		19
4254A	1.5/45°	1.50	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		22
4268A	1.0/45°	1.00	45°30'	3°	10°	65°	3.5	38°	2.6	R1.5		20
4444A	0.85/45°	0.85	45°30'	3°	10°	70°	3.5	30°	1.2			18
4460C	0.85/45°	0.85	45°30'	3°	15°	R3.3	0.5	30°	1.2			18
4502B	2.0/30°	2.00	30°30'	3°	10°	74°	4.0	15°	1.5			28
4503B	2.0/35°	2.00	35°30'	3°	10°	60°	3.5	15°	1.5			31
4504B	1.5/30°	1.50	30°30'	3°	10°	60°	3.5	0°	2.0			28
4505BX	2.6/38°	2.60	38°30'	3°	10°	60°	3.5	15°	1.5			31
4506B	3.5/30°	3.50	30°30'	3°	10°	60°	3.5	R0.6				29
4507B	3.2/35°	3.20	35°30'	3°	10°	75°	5.5	0°	1.0			31
4508B	1.7/35°	1.70	35°30'	3°	10°	60°	5.0	0°	1.0			31
4509BX	2.0/30°	2.00	30°30'	3°	10°	65°	3.5	23°	1.5	R1.5		28
4510B	1.0/30°	1.00	30°30'	3°	10°	R12		15°	2.0			28
4512BX	2.5/30°	2.50	30°30'	3°	10°	75°	4.0	15°	3.5			29
4514B	1.0/30°	1.00	30°30'	3°	10°	52°	3.5	23°	1.5			28
4515A	1.5/30°	1.50	30°30'	3°	10°	52°	3.5	23°	1.5			28
4515AX	1.5/30°	1.50	30°30'	3°	10°	52°	3.5	23°	1.5			28
4515B	1.5/30°	1.50	30°30'	3°	10°	52°	3.5	23°	1.5			28
4515BX	1.5/30°	1.50	30°30'	3°	10°	52°	3.5	23°	1.5			28
4516B	2.0/30°	2.00	30°30'	3°	10°	52°	3.5	23°	1.5			28
4516BX	2.0/30°	2.00	30°30'	3°	10°	52°	3.5	23°	1.5			28
4517B	2.5/30°	2.50	30°30'	3°	10°	52°	3.5	23°	1.5			29
4518A	1.2/30°	1.20	30°30'	3°	10°	55°	3.5	10°	1.7			28
4519B	3.0/30°	3.00	30°30'	3°	10°	60°	3.5	0°	1.0	R1.7		29
4520B	0.7/30°	0.75	30°30'	3°	10°	R9.2	3.5	20°	1.5	R0.9		28
4523B	2.5/20°	2.50	20°30'	3°	10°	60°	4.0	0°	1.8			30
4524B	2.0/20°	2.00	20°30'	3°	10°	60°	4.0	0°	1.8			30
4525B	2.0/30°	2.00	30°30'	3°	10°	60°	4.5	15°	0.8			28
4526BX	2.0/30°	2.00	30°30'	3°	10°	60°	5.0	15°	3.5			28
4529B	1.5/35°	1.50	35°30'	3°	10°	60°	3.5	15°	1.5			31
4530BX	1.2/30°	1.20	30°30'	3°	10°	75°	4.0	15°	2.0			28
4531B	7.0/30°	7.00	30°30'	3°	10°			15°	2.5			29
4535B	5.0/30°	5.00	30°30'	3°	10°	60°	4.0					29
4535BX	5.0/30°	5.00	30°30'	3°	10°	60°	4.0					29
4542B	2.0/35°	2.00	35°30'	3°	10°	70°	3.2	7°	1.0			31
4543BX	1.5/30°	1.50	30°30'	3°	10°	75°	4.0	15°	3.5			28
4544B	3.25/20°	3.25	20°30'	3°	10°	60°	6.2					30
4544BX	3.25/20°	3.25	20°30'	3°	10°	60°	6.2					30
4547B	1.5/30°	1.50	30°30'	3°	10°	75°	5.0	15°	1.5			28
4549BX	3.0/30°	3.00	30°30'	3°	10°	65°	3.5	23°	1.5	R1.5		29

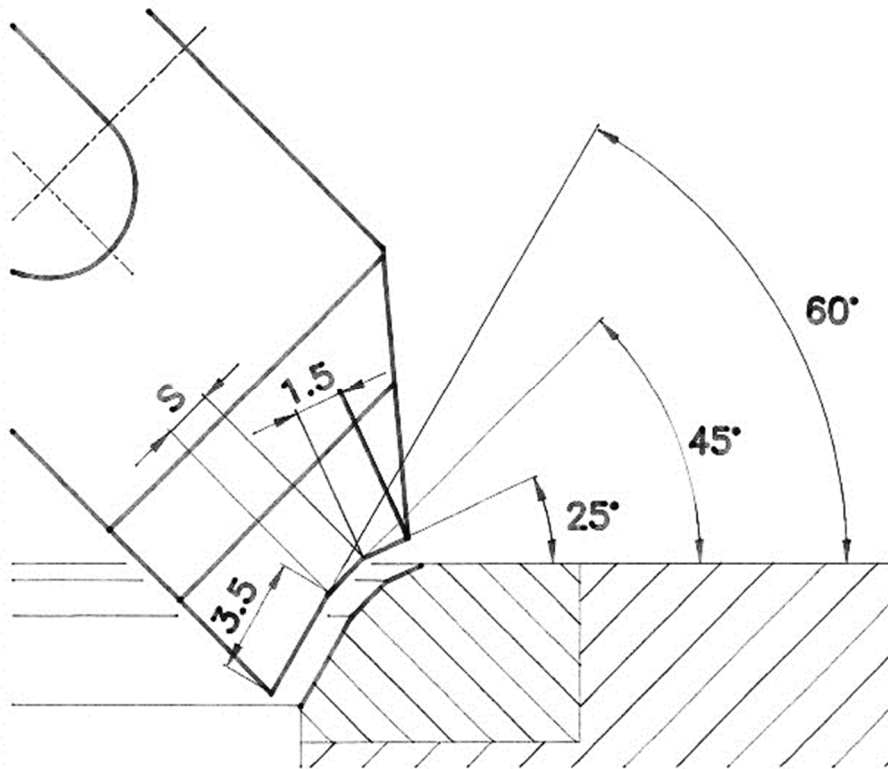
Specification		seatwidth	seatangle	Cutting angle	Clearance angle	Lower correction		1. Upper correction		2. Upper correction		Page
Bezeichnung		Sitzbreite	Sitzwinkel	Schnittwinkel	Freiwinkel	Untere Korrektur		1. Obere Korrektur		2. Ober Korrektur		Seite
		S	$\sphericalangle\alpha$	$\sphericalangle\delta$	$\sphericalangle\varepsilon$	$\sphericalangle\beta$	L	$\sphericalangle\gamma$	L	$\sphericalangle\gamma$	L	Nr.
4552B	3.0/20°	3.00	20°30'	3°	10°	60°	3.5	15°	1.5			30
4552BX	3.0/20°	3.00	20°30'	3°	10°	60°	3.5	15°	1.5			30
4557B	4.5/30°	4.50	30°30'	3°	10°			0°	0.4	45°	7.3	29
4558B	2.0/37.5°	2.00	37.5°	3°	10°	60°	3.5	15°	1.5			31
4567B	9.0/30°	9.00	30°30'	3°	10°			0°	0.5			29

- 8 Standard Formtool 45°
- 8 Standard-Formstähle 45°
- 8 *Outils de façon standard 45°*
- 8 *Standard skärstål 45°*
- 8 Utensili ad angolazione multipla standard 45°
- 8 *Cuchillas de mandrinado moldeada standard 45°*



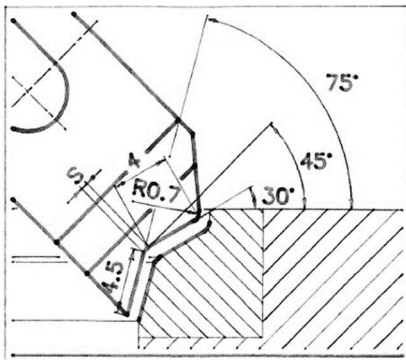
mira reference	Seat width	Seat angle
115A 1.5/45°	1.5	45°30'
120A 2.0/45°	2.0	45°30'
125B 2.5/45°	2.5	45°30'

- 9 **Formtools 45°**
- 9 **Formst le 45°**
- 9 **Outils de fa on 45°**
- 9 **Sk rst l 45°**
- 9 **Utensili ad angolazione multipla 45°**
- 9 **Cuchillas de mandrinado moldeada 45°**

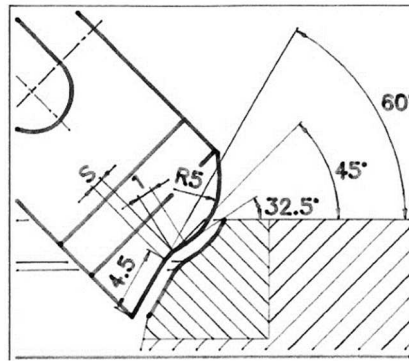


mira reference	Seat width	Seat angle
105C	0.5/45°	45°30'
107C	0.7/45°	45°30'
108A	0.8/45°	45°30'
108B	0.8/45°	45°30'
108C	0.8/45°	45°30'
108CX	0.8/45°	45°30'
110A	1.0/45°	45°30'
110AX	1.0/45°	45°30'
110B	1.0/45°	45°30'
110BX	1.0/45°	45°30'
110C	1.0/45°	45°30'
110CX	1.0/45°	45°30'
115AX	1.5/45°	45°30'
115B	1.5/45°	45°30'
115BX	1.5/45°	45°30'
115C	1.5/45°	45°30'
115CX	1.5/45°	45°30'
115DT	1.5/45°	45°30'

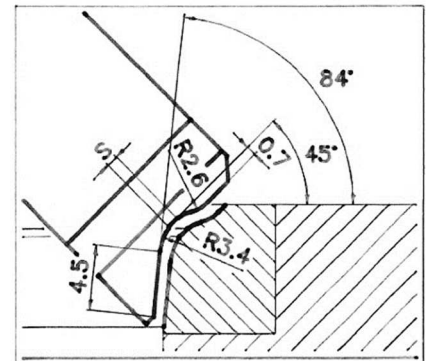
mira reference	Seat width	Seat angle
120AX	2.0/45°	45°30'
120B	2.0/45°	45°30'
120BX	2.0/45°	45°30'
120DT	2.0/45°	45°30'
125A	2.5/45°	45°30'
125BX	2.5/45°	45°30'
125DT	2.5/45°	45°30'
130B	3.0/45°	45°30'
130BX	3.0/45°	45°30'
135B	3.5/45°	45°30'
135DT	3.5/45°	45°30'
140B	4.0/45°	45°30'



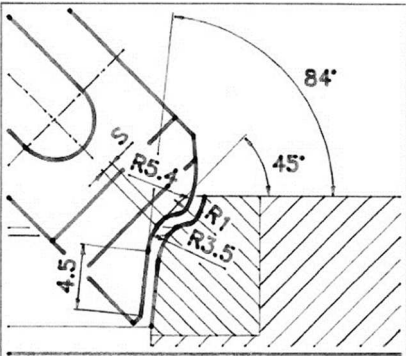
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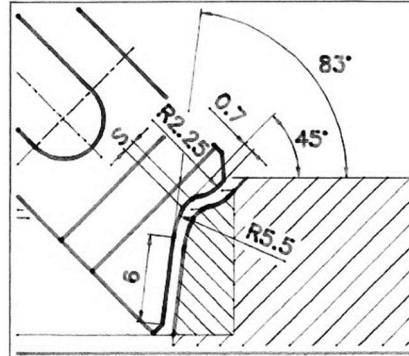
4064 S=0.8mm



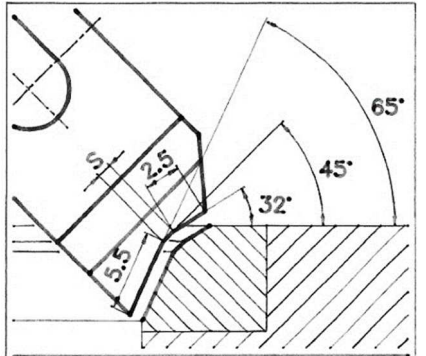
4141 S=0.8mm



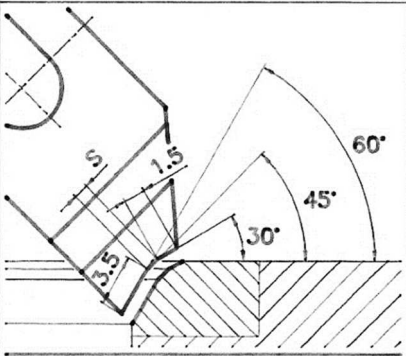
4142 S=0.8mm



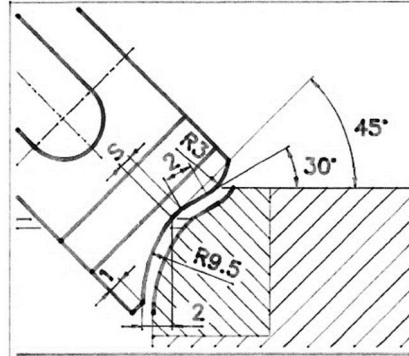
4143 S=0.8mm



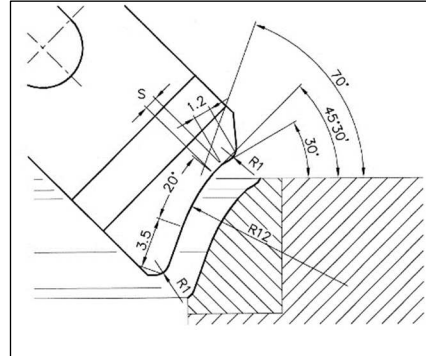
4182 S=0.8mm



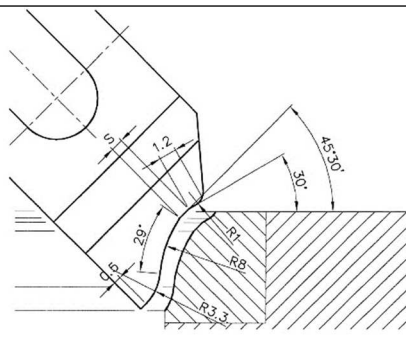
4231 S=0.8mm



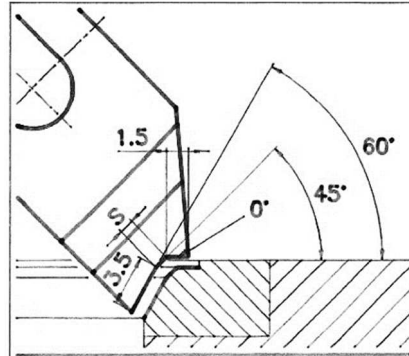
4229 S=0.85mm



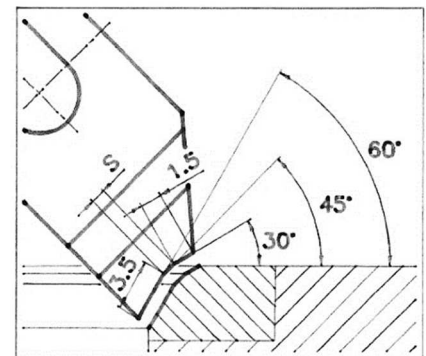
4444 S=0.85mm



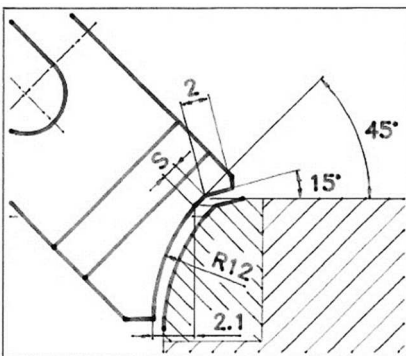
4460 S=0.85mm



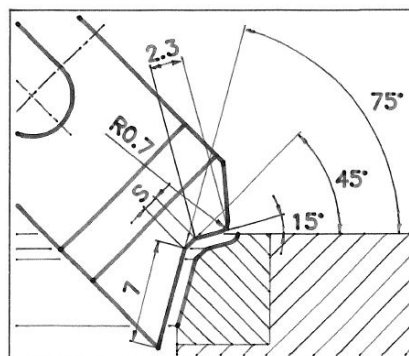
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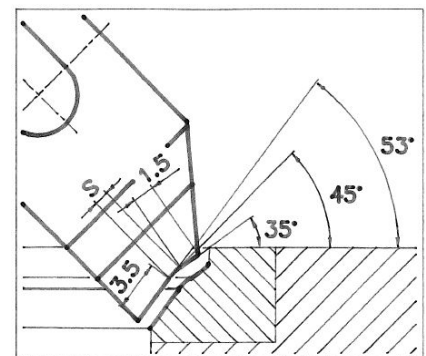
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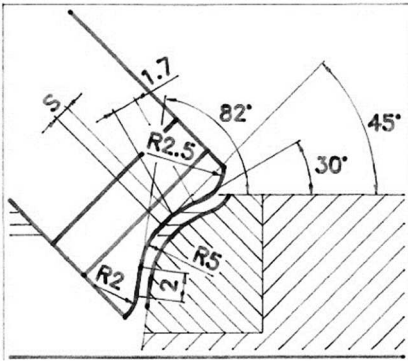
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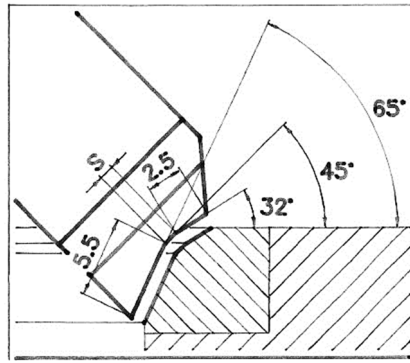
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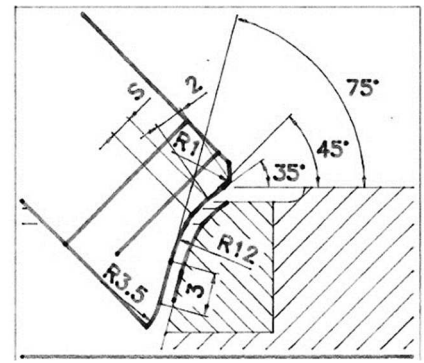
4037 S=1.0mm



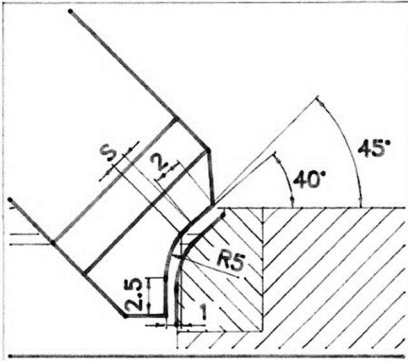
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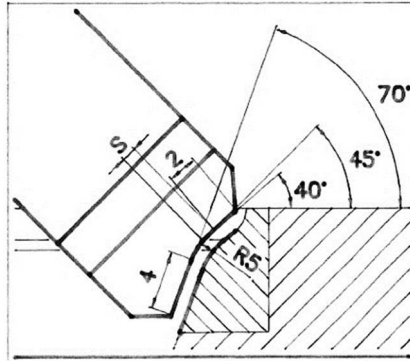
4042 S=1.0mm



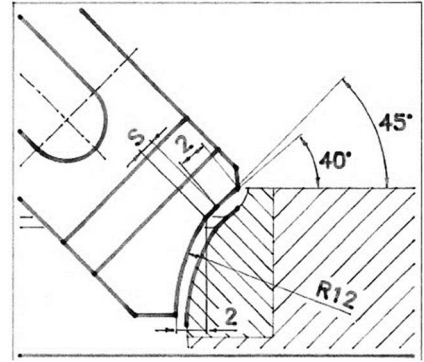
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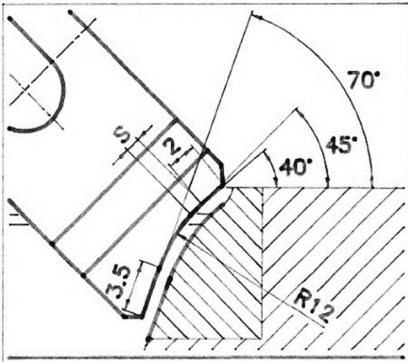
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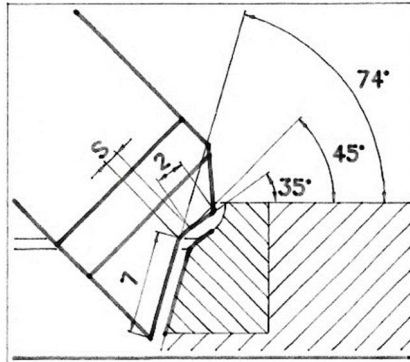
4046 S=1.0mm



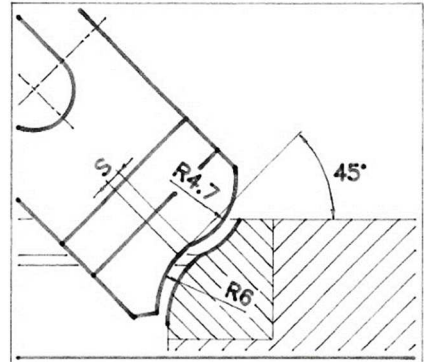
4047 S=1.0mm



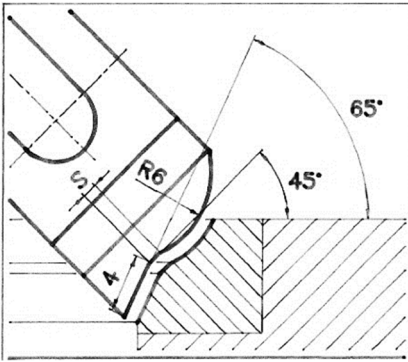
4048 S=1.0mm



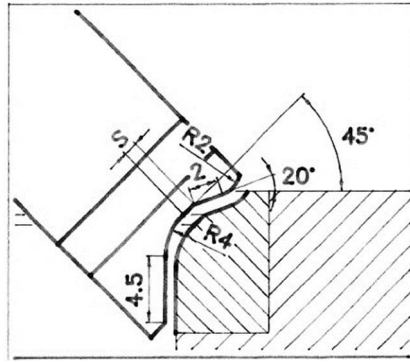
4050 S=1.0mm



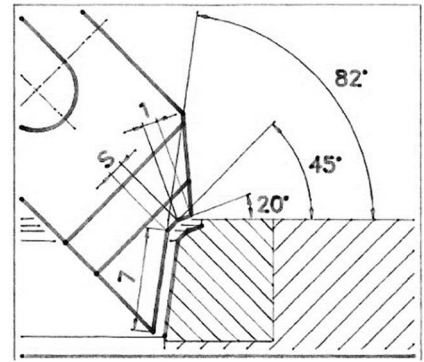
4063 S=1.0mm



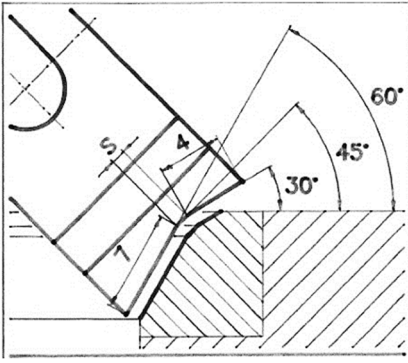
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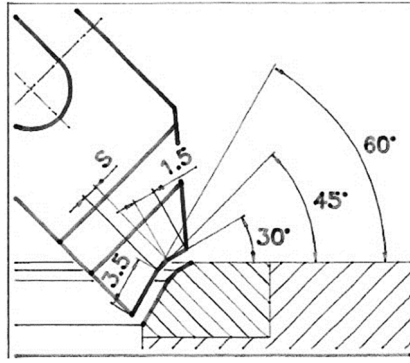
4095 S=1.0mm



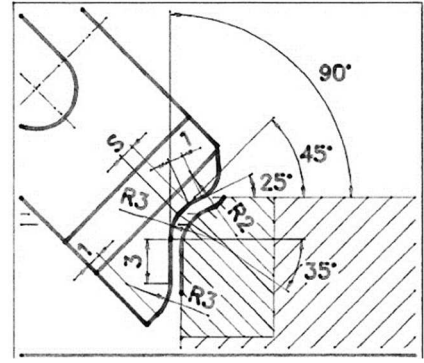
4135 S=1.0mm



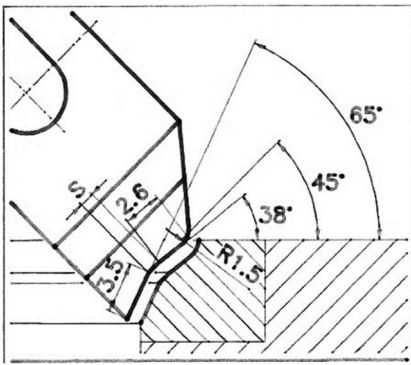
4144 S=1.0mm



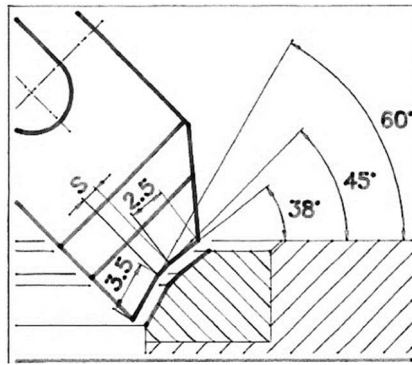
4232 S=1.0mm



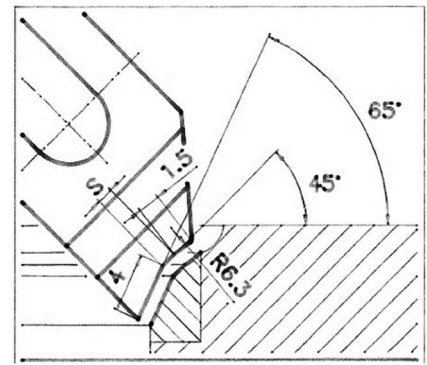
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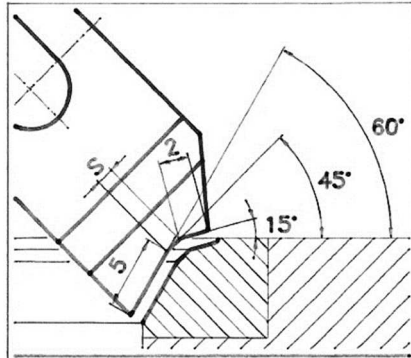
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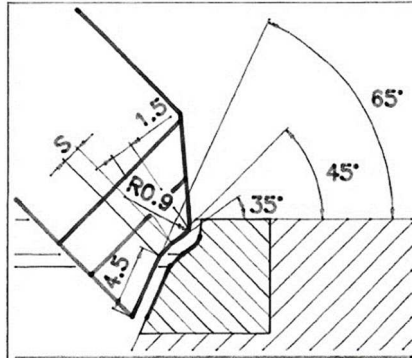
4102 S=1.1mm



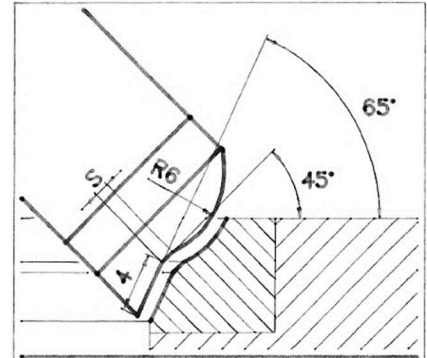
4131 S=1.1mm



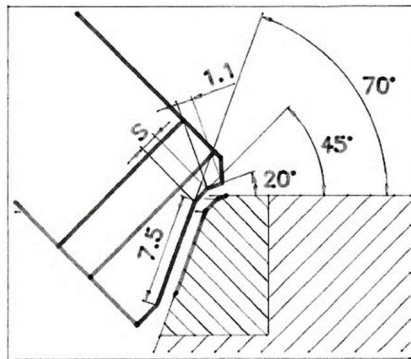
4036 S=1.2mm



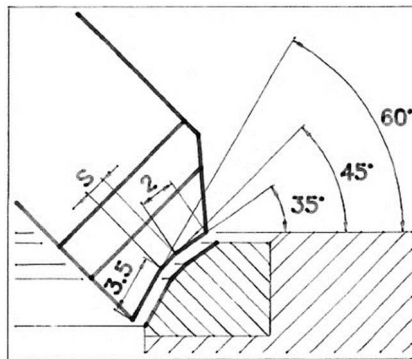
4065 S=1.2mm



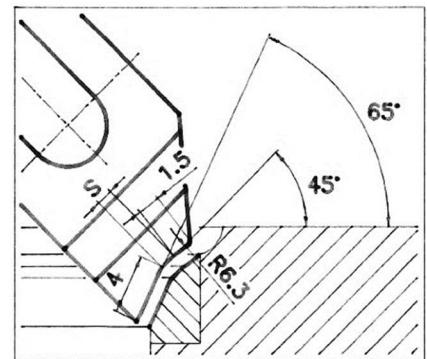
4087 S=1.2mm



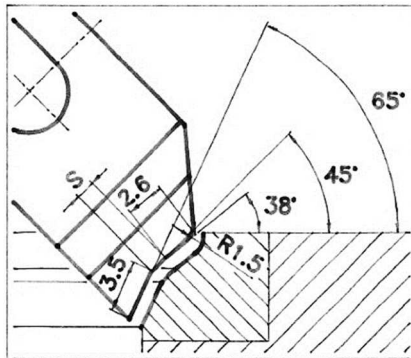
4094 S=1.2mm



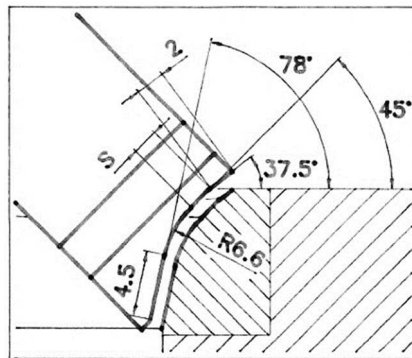
4101 S=1.2mm



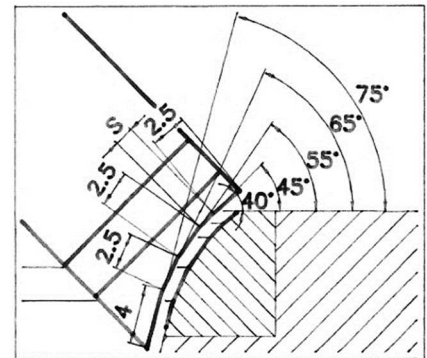
4132 S=1.2mm



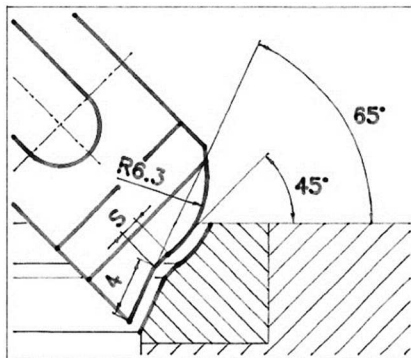
4030 S=1.3mm



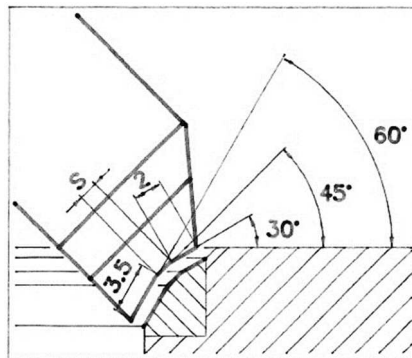
4076 S=1.3mm



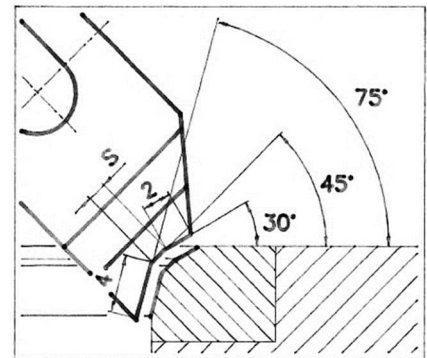
4077 S=1.3mm



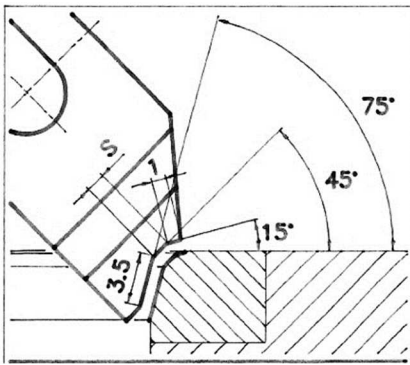
4090 S=1.3mm



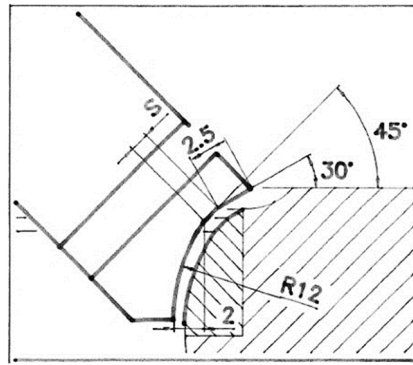
4099 S=1.3mm



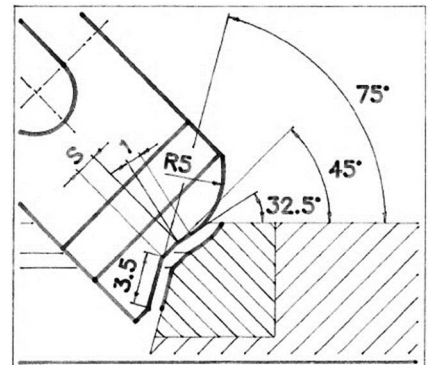
4147 S=1.3mm



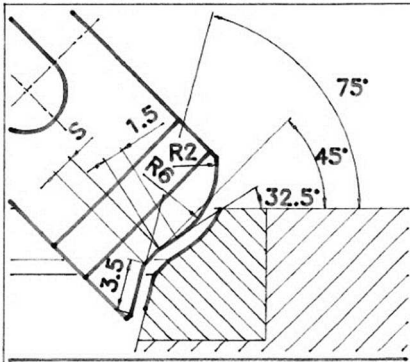
4148 S=1.3mm



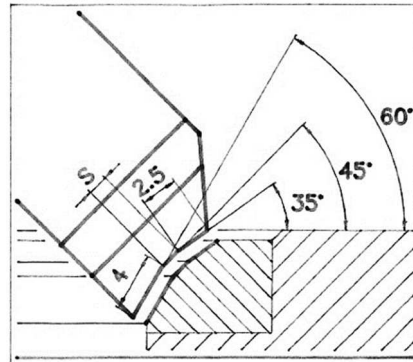
4157 S=1.3mm



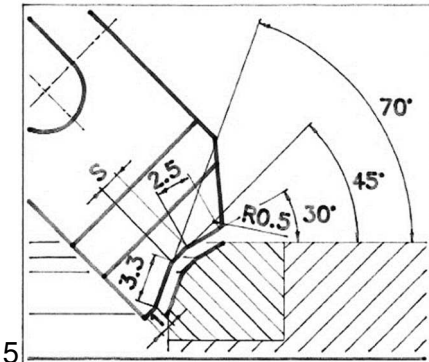
4060 S=1.4mm



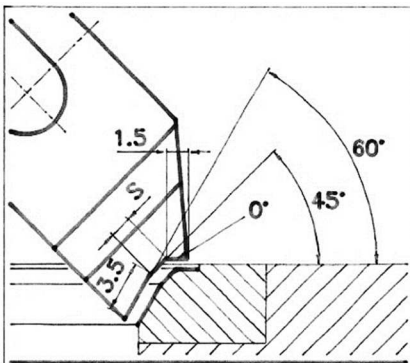
4061 S=1.4mm



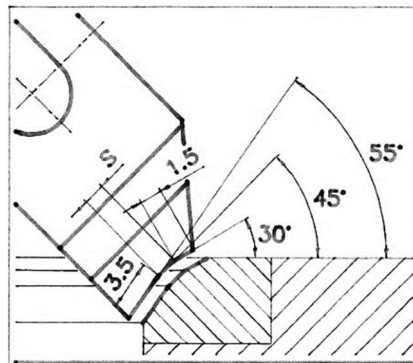
4100 S=1.4mm



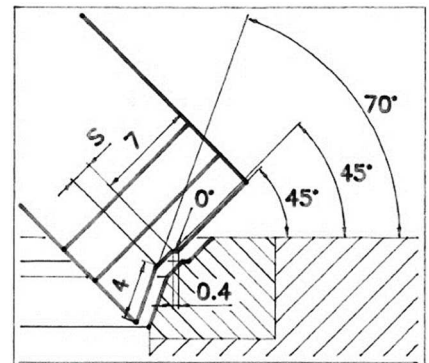
4203 S=1.4mm



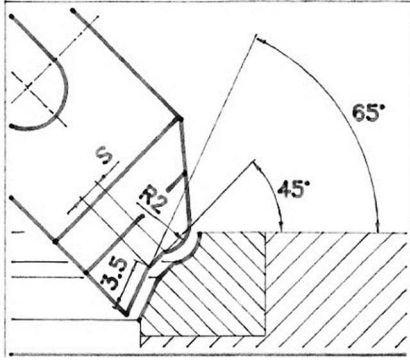
4002 S=1.5mm



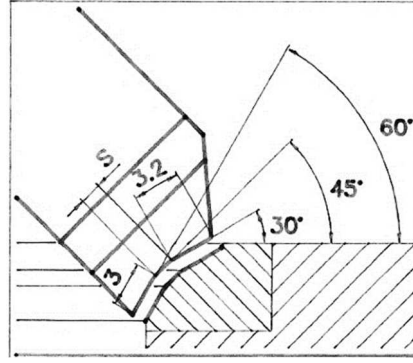
4005 S=1.5mm



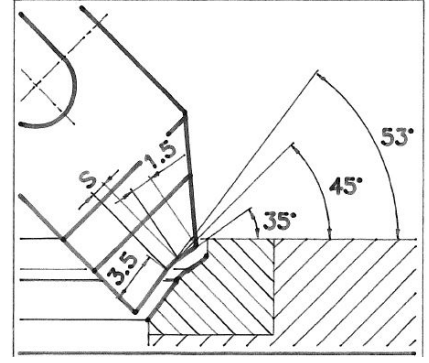
4018 S=1.5mm



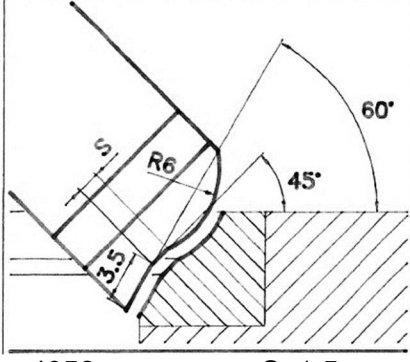
4020 S=1.5mm



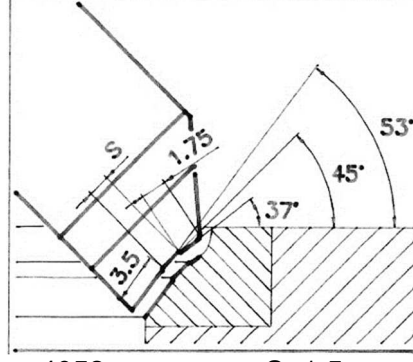
4033 S=1.5mm



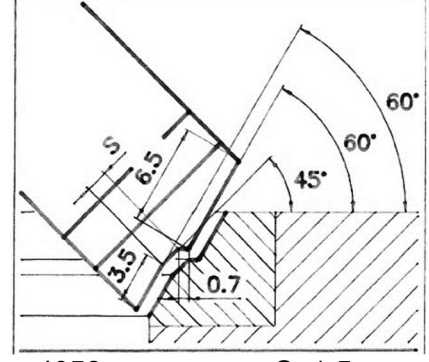
4038 S=1.5mm



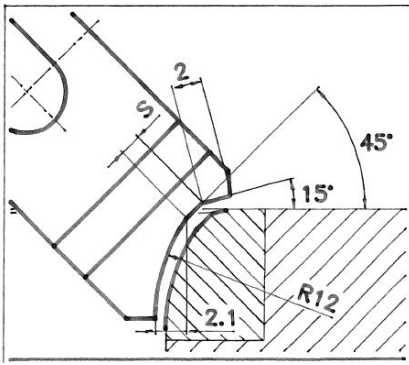
4052 S=1.5mm



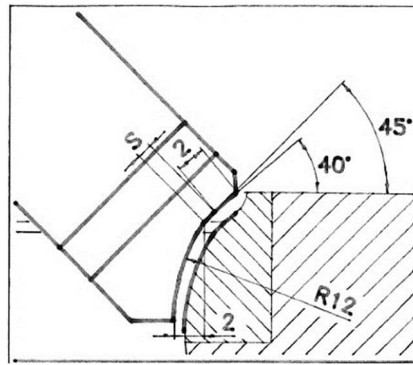
4053 S=1.5mm



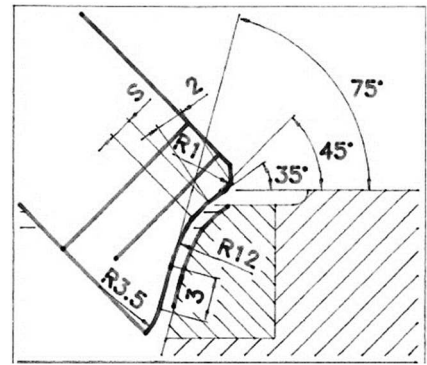
4058 S=1.5mm



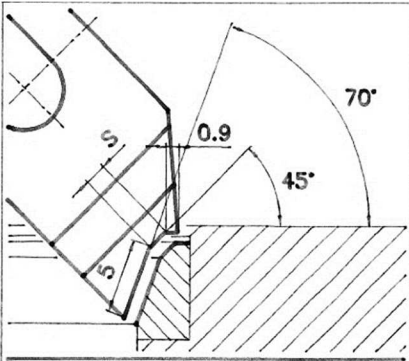
4074 S=1.5mm



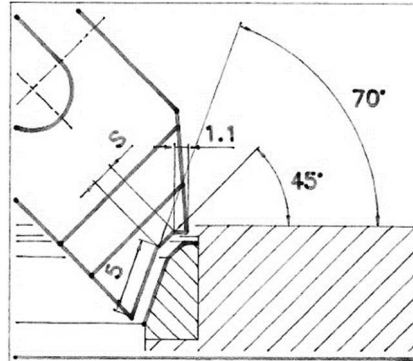
4098 S=1.5mm



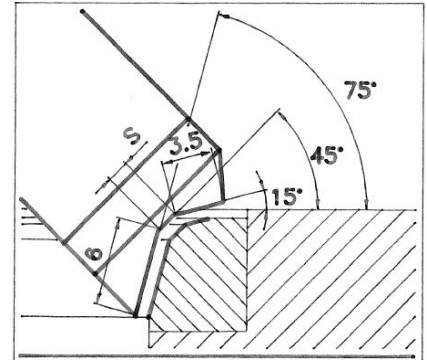
4104 S=1.5mm



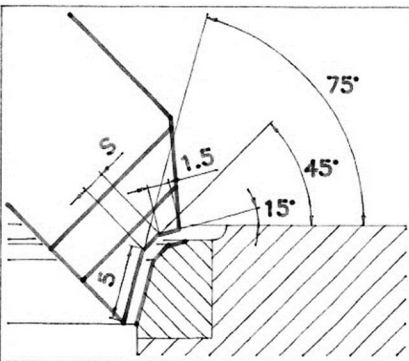
4109 S=1.5mm



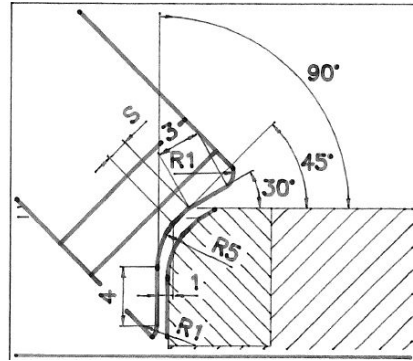
4112 S=1.5mm



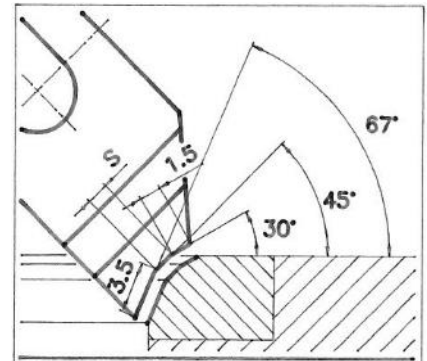
4122 S=1.5mm



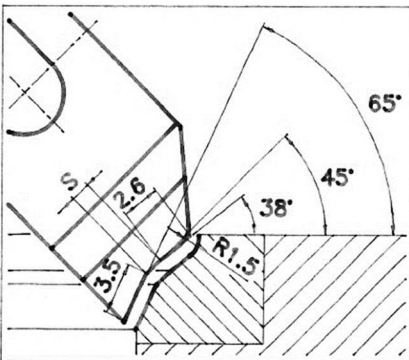
4129 S=1.5mm



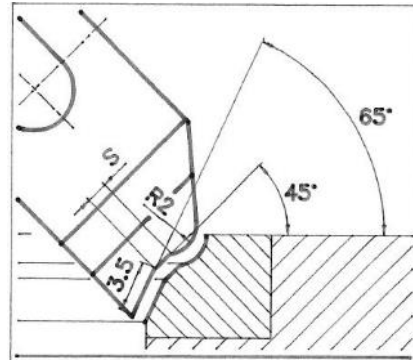
4138 S=1.5mm



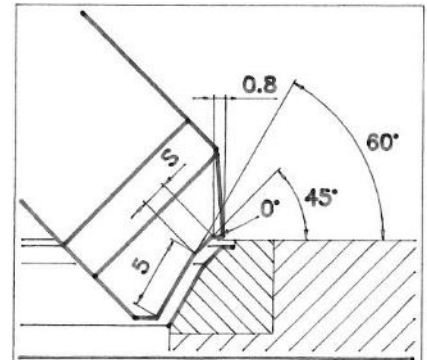
4243 S=1.5mm



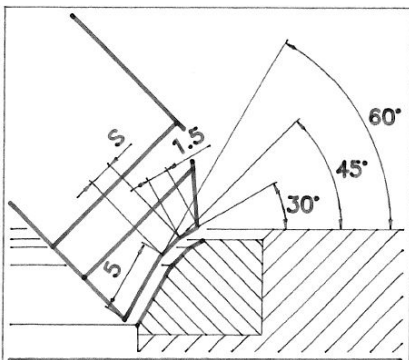
4254 S=1.5mm



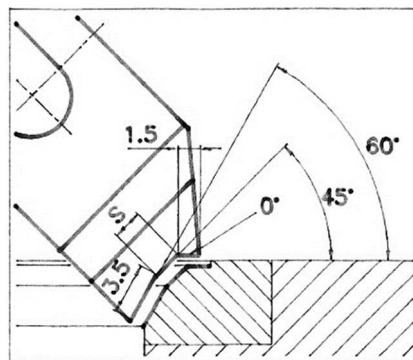
4021 S=1.7mm



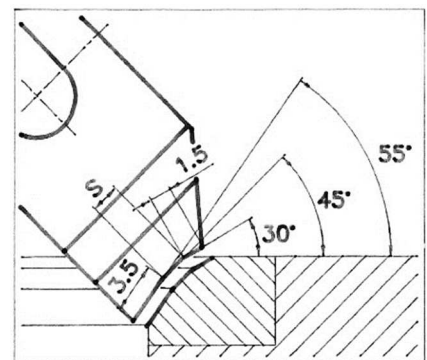
4022 S=1.7mm



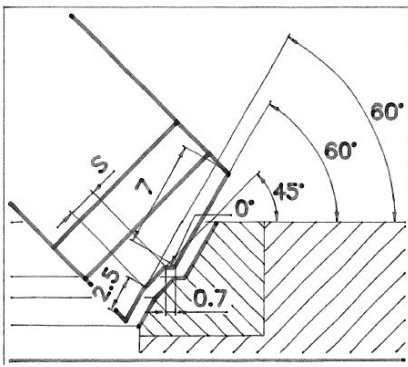
4140 S=1.7mm



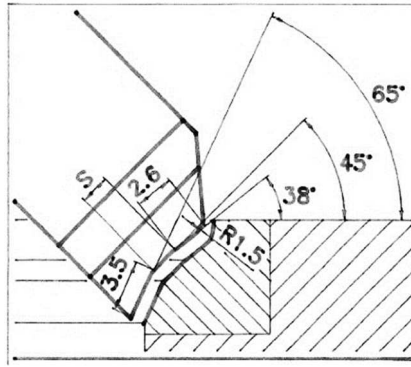
4003 S=2.0mm



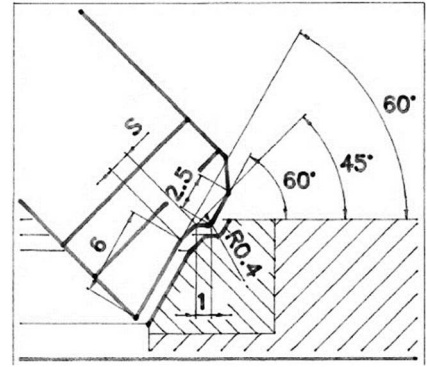
4006 S=2.0mm



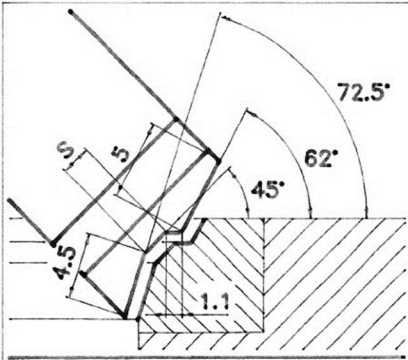
4012 S=2.0mm



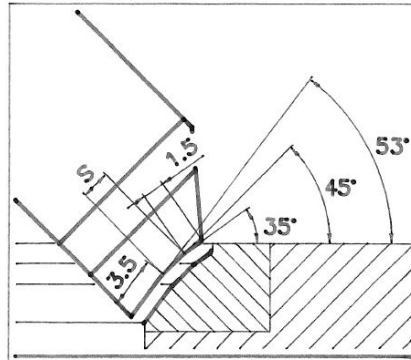
4025 S=2.0mm



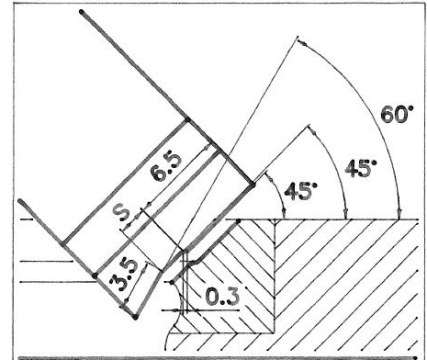
4027 S=2.0mm



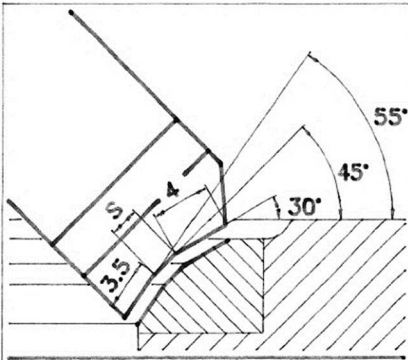
4034 S=2.0mm



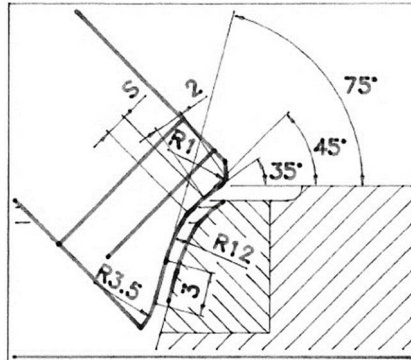
4039 S=2.0mm



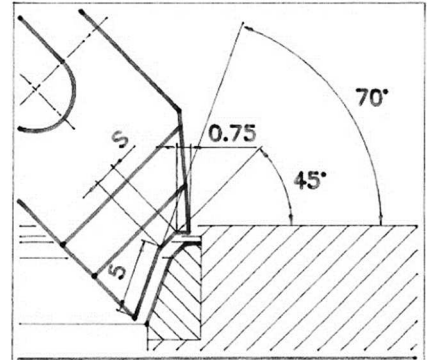
4080 S=2.0mm



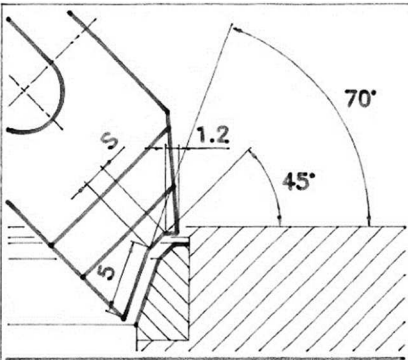
4081 S=2.0mm



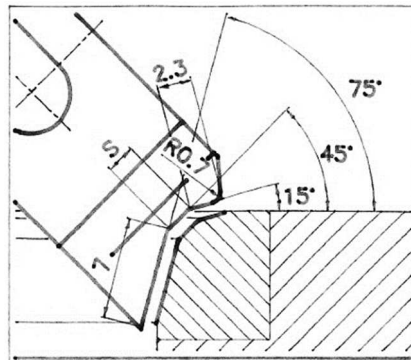
4105 S=2.0mm



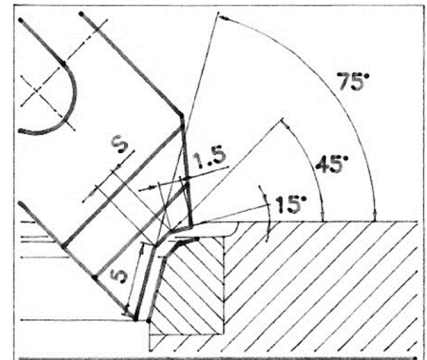
4110 S=2.0mm



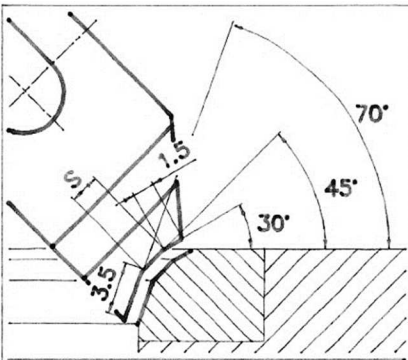
4111 S=2.0mm



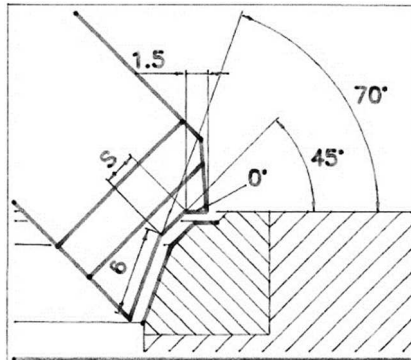
4121 S=2.0mm



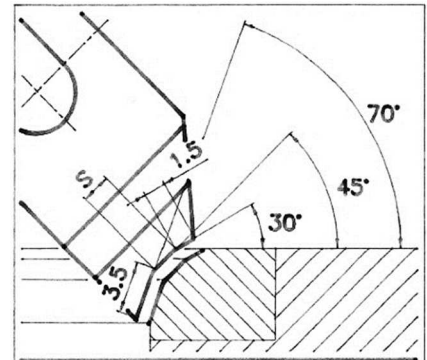
4130 S=2.0mm



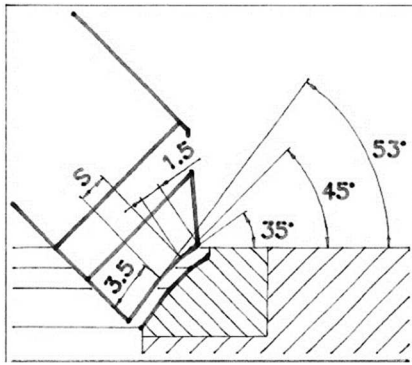
4187 S=2.0mm



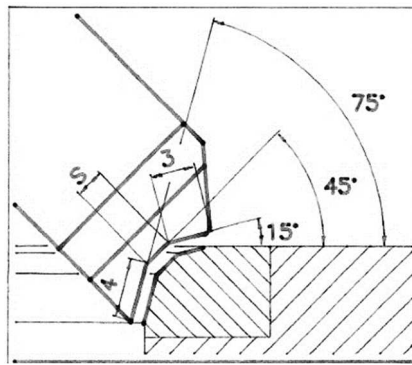
4096 S=2.3mm



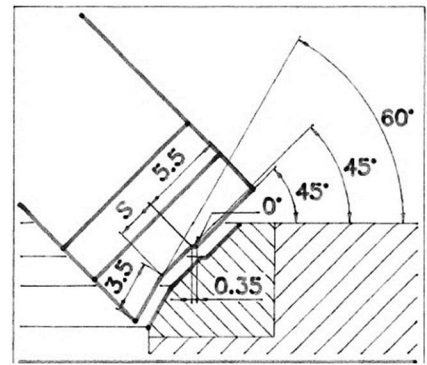
4188 S=2.4mm



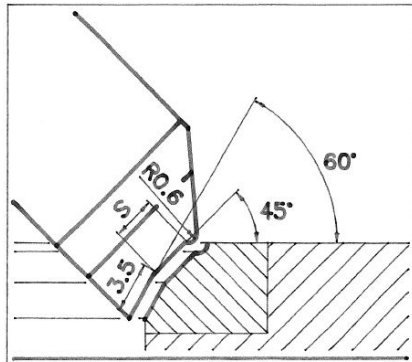
4040 S=2.5mm



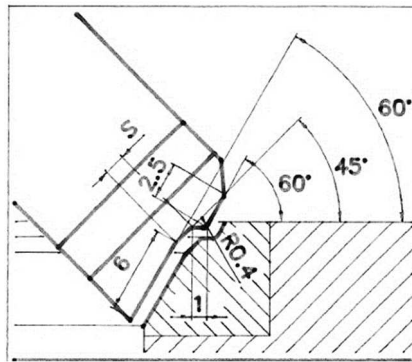
4107 S=2.5mm



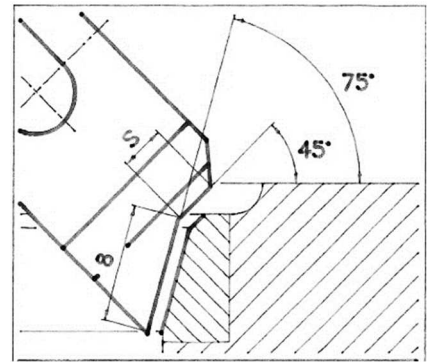
4011 S=2.8mm



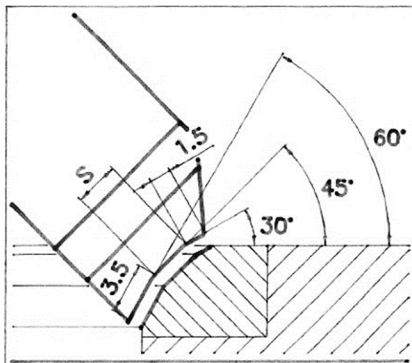
4015 S=3.0mm



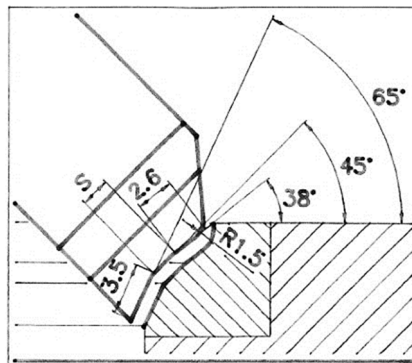
4028 S=3.0mm



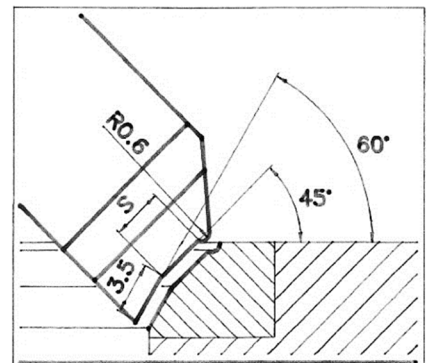
4091 S=3.0mm



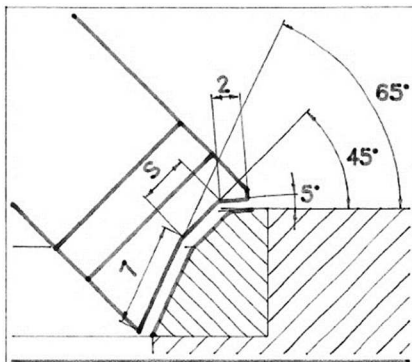
4093 S=3.0mm



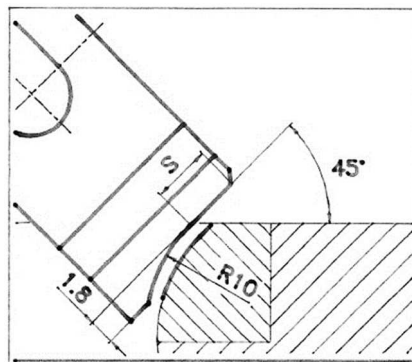
4139 S=3.0mm



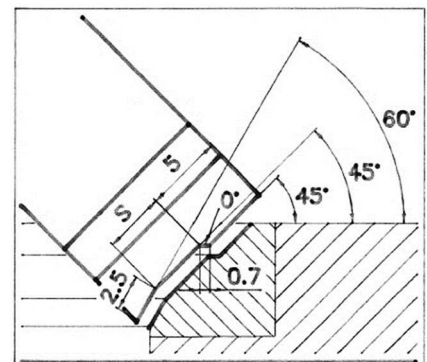
4016 S=3.5mm



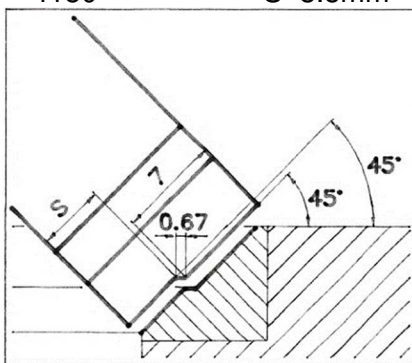
4150 S=3.5mm



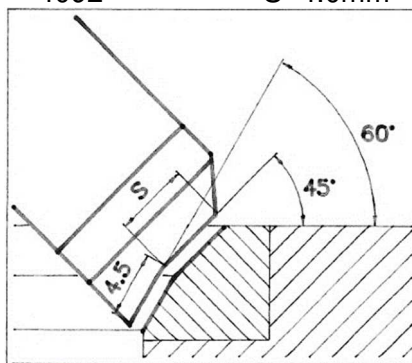
4092 S=4.0mm



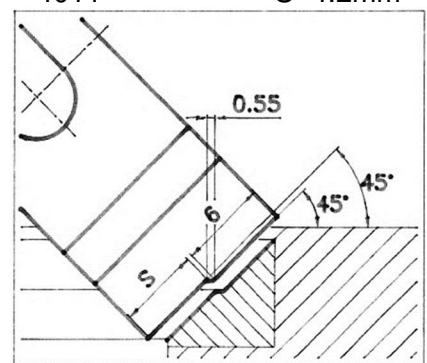
4011 S=4.2mm



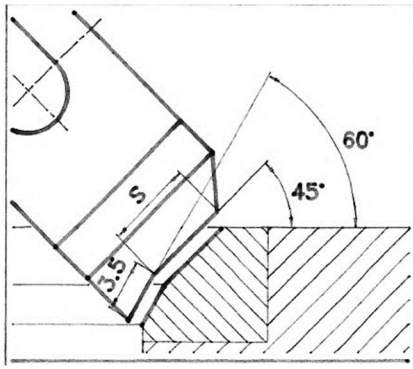
4158 S=4.5mm



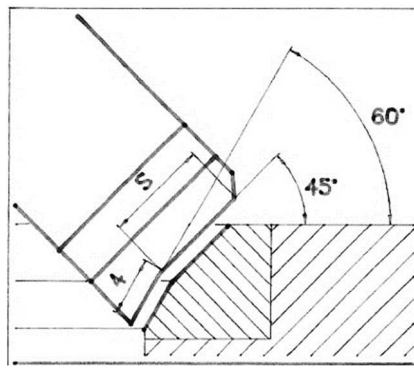
4023 S=5.0mm



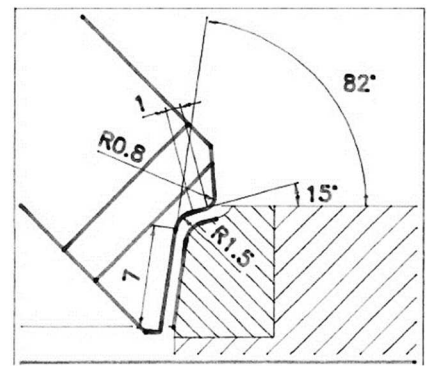
4159 S=5.5mm



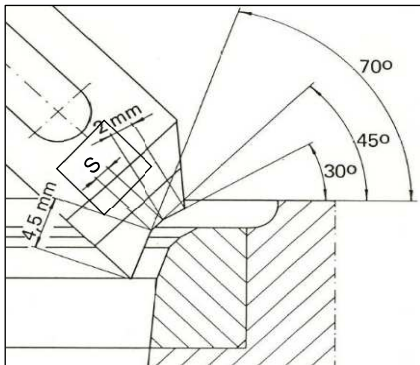
4009 S=6.0mm



4072 S=7.0mm

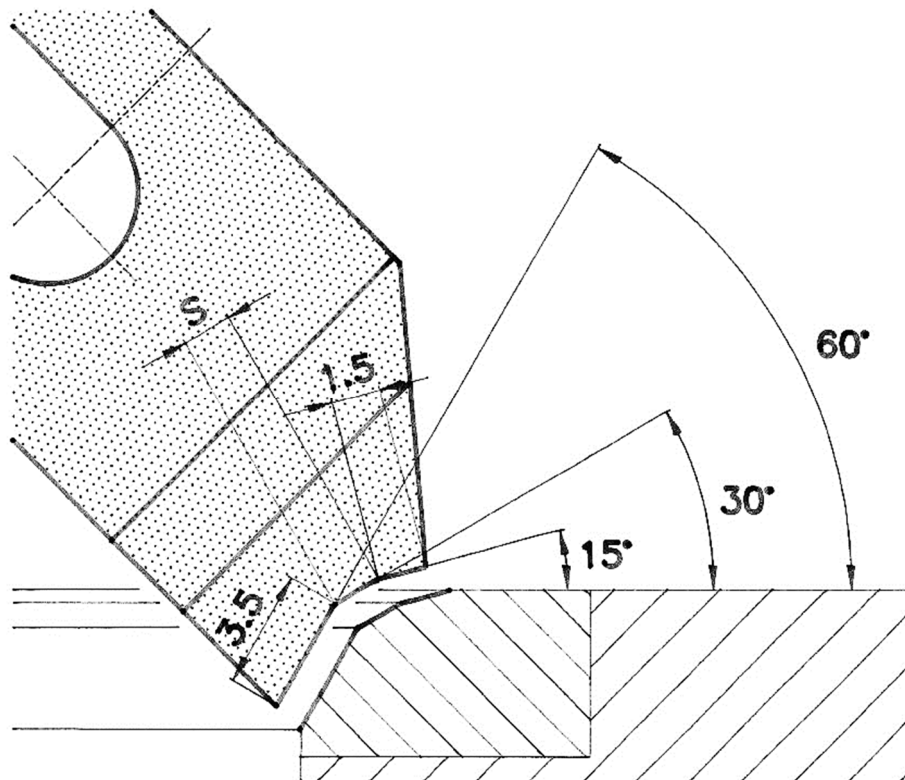


4136



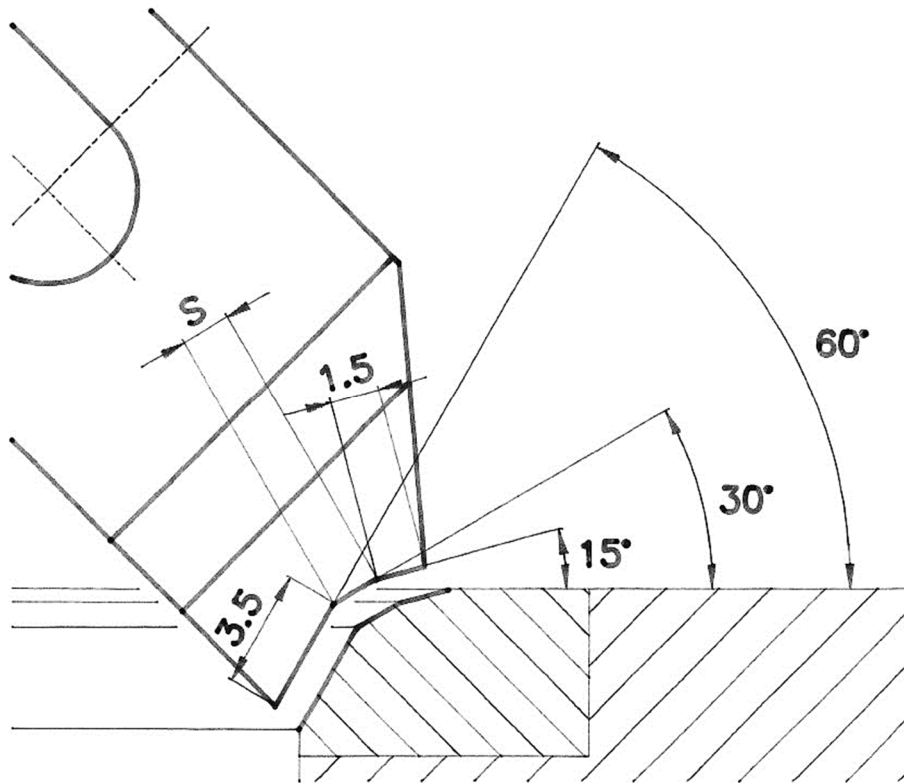
4120 S=1.2mm

- 10 Standard Formtool 30°
- 10 Standard-Formstähle 30°
- 10 *Outils de façon standard 30°*
- 10 *Standard skärstål 30°*
- 10 Utensili ad angolazione multipla standard 30°
- 10 *Cuchillas de mandrinado moldeada standard 30°*



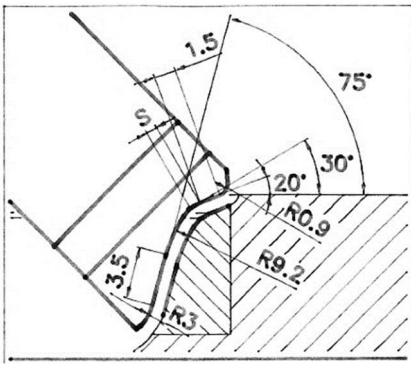
mira reference	Seat width	Seat angle
215A 1.5/30°	1.5	30°30'
220A 2.0/45°	2.0	30°30'
225B 2.5/45°	2.5	30°30'

- 11 Formtools 30°
- 11 Formstähle 30°
- 11 *Outils de façon 30°*
- 11 *Skärstål 30°*
- 11 Utensili ad angolazione multipla 30°
- 11 *Cuchillas de mandrinado moldeada 30°*

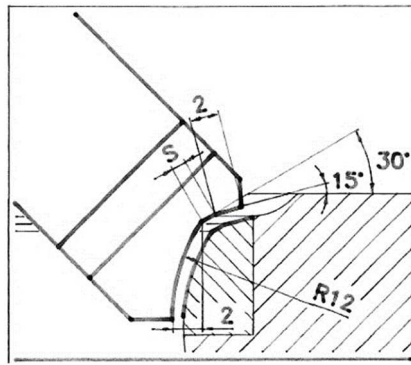


mira reference	Seat width	Seat angle
208C	0.8/30°	0.8 30°30'
210A	1.0/30°	1.0 30°30'
210AX	1.0/30°	1.0 30°30'
210B	1.0/30°	1.0 30°30'
210BX	1.0/30°	1.0 30°30'
210C	1.0/30°	1.0 30°30'
212B	1.2/30°	1.2 30°30'
215AX	1.5/30°	1.5 30°30'
215B	1.5/30°	1.5 30°30'
215BX	1.5/30°	1.5 30°30'
215C	1.5/30°	1.5 30°30'

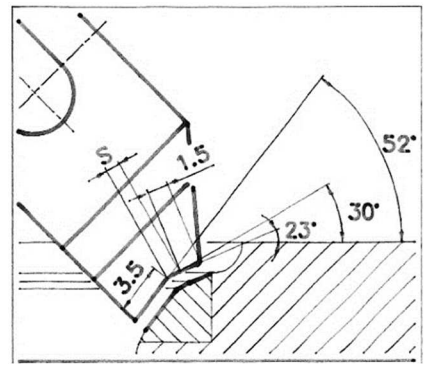
mira reference	Seat width	Seat angle
220AX	2.0/30°	2.0 30°30'
220B	2.0/30°	2.0 30°30'
220BX	2.0/30°	2.0 30°30'
220DT	2.0/30°	2.0 30°30'
225BX	2.5/30°	2.5 30°30'
225DT	2.5/30°	2.5 30°30'
230B	3.0/30°	3.0 30°30'
230BX	3.0/30°	3.0 30°30'
230DT	3.0/30°	3.0 30°30'
235B	3.5/30°	3.5 30°30'
240B	4.0/30°	4.0 30°30'



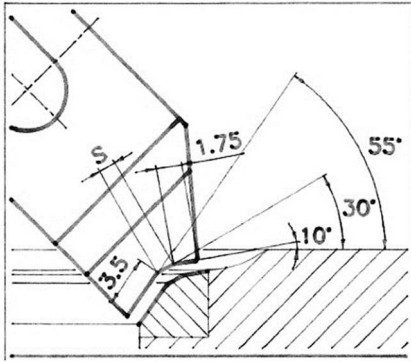
4520 S=0.75mm



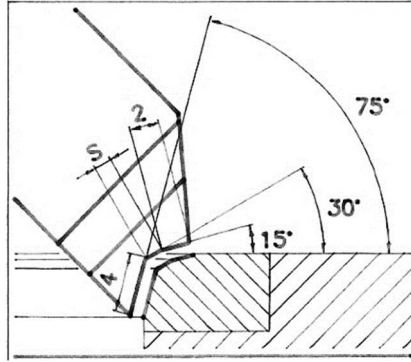
4510 S=1.0mm



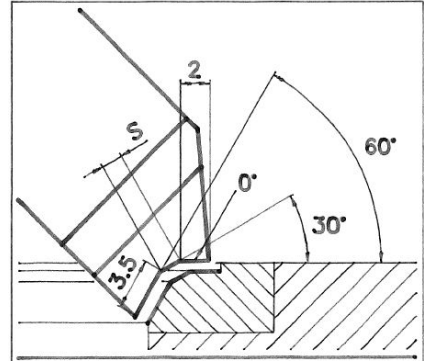
4514 S=1.0mm



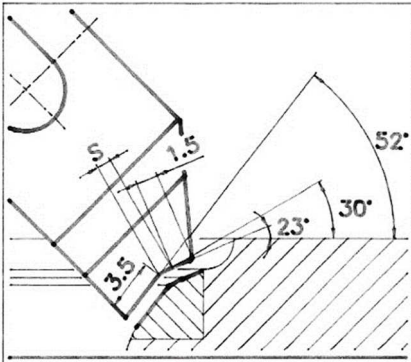
4518 S=1.2mm



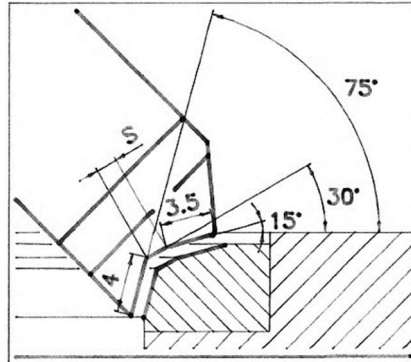
4530 S=1.2mm



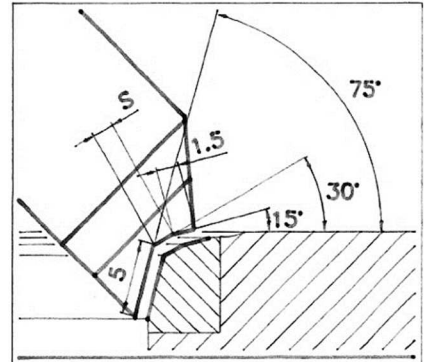
4504 S=1.5mm



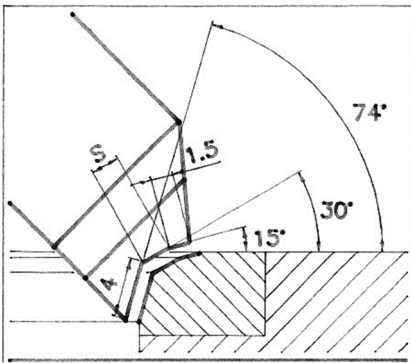
4515 S=1.5mm



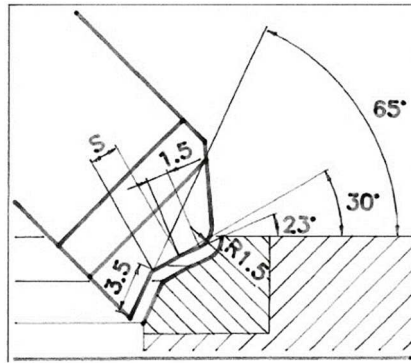
4543 S=1.5mm



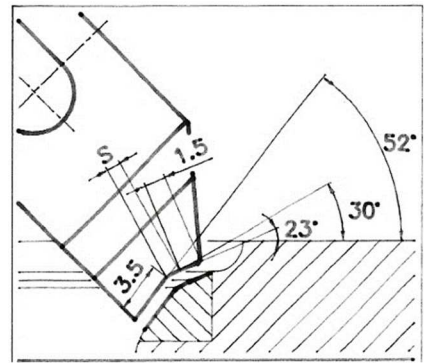
4547 S=1.5mm



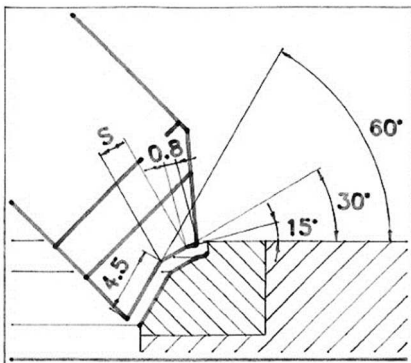
4502 S=2.0mm



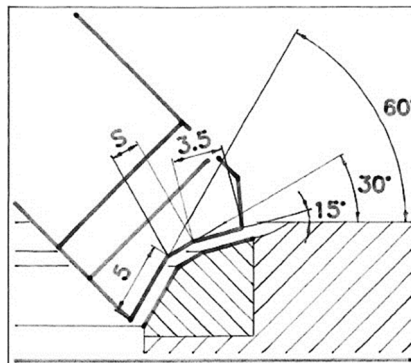
4509 S=2.0mm



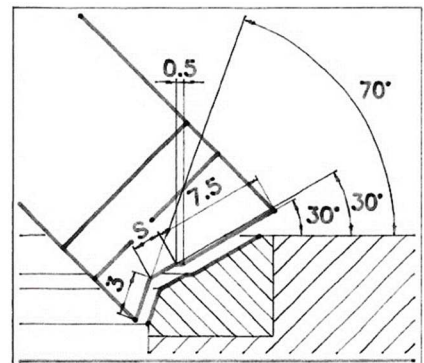
4516 S=2.0mm



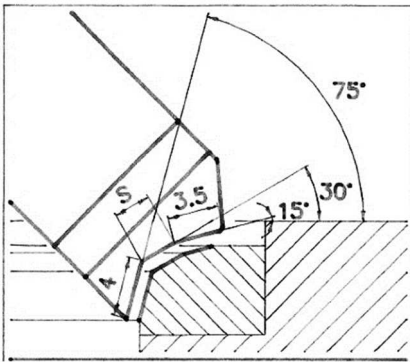
4525 S=2.0mm



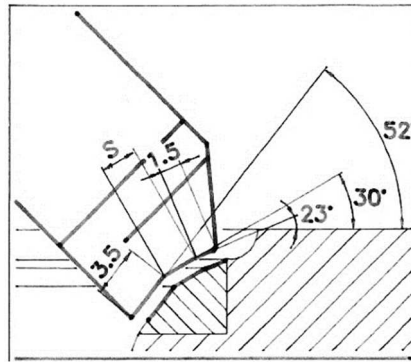
4526 S=2.0mm



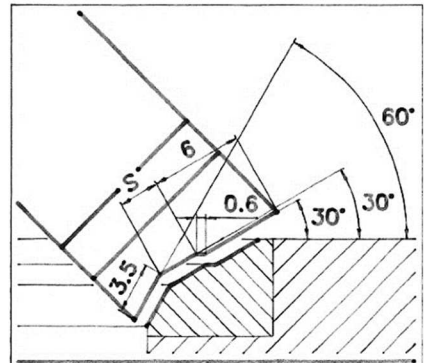
4538 S=2.0mm



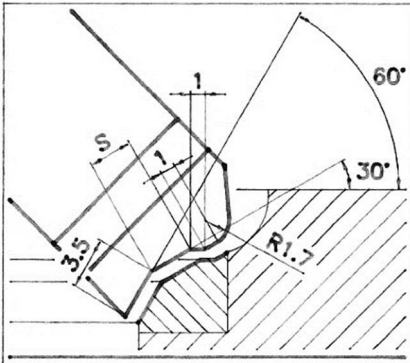
4512 S=2.5mm



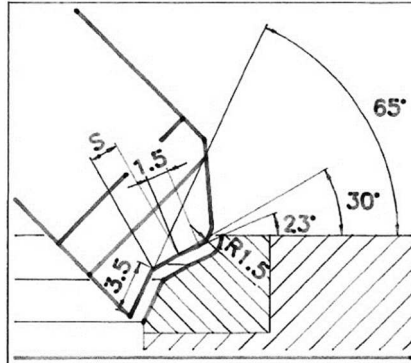
4517 S=2.5mm



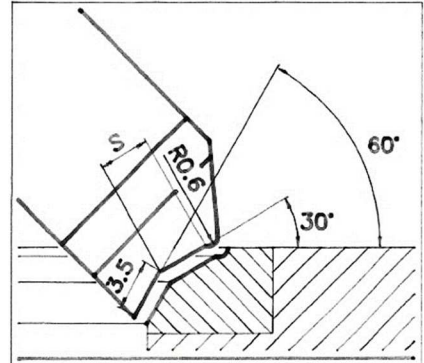
4539 S=2.8mm



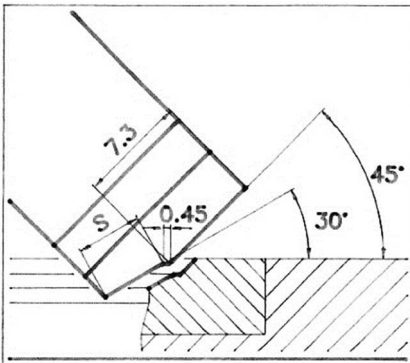
4519 S=3.0mm



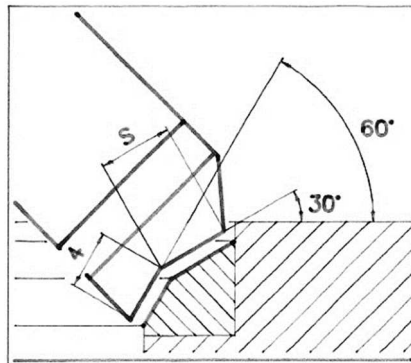
4549 S=3.0mm



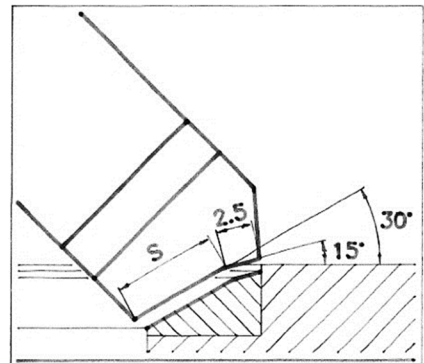
4506 S=3.5mm



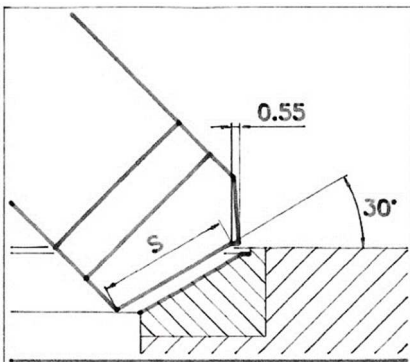
4557 S=4.5mm



4535 S=5.0mm

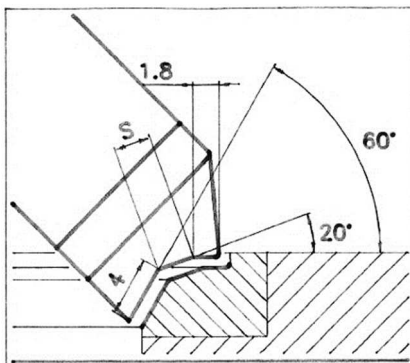


4531 S=7.0mm

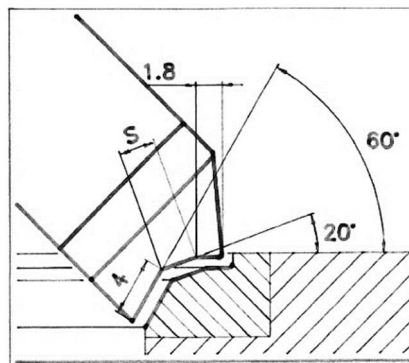


4567 S=9.0mm

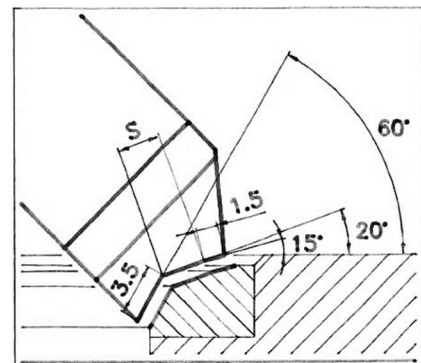
- 12 Formtools 20°**
- 12 Formstähle 20°**
- 12 Outils de façon 20°**
- 12 Skärstål 20°**
- 12 Utensili ad angolazione multipla 20°**
- 12 Cuchillas de mandrinado moldeada 20°**



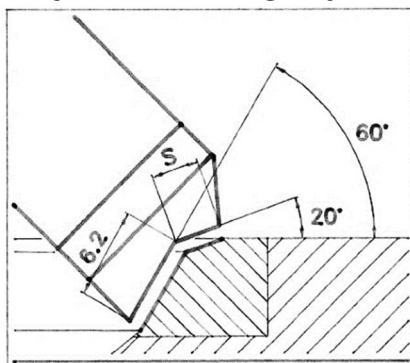
4524 S=2.0mm



4523 S=2.5mm

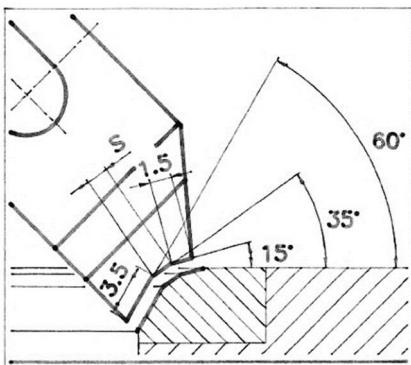


4552 S=3.0mm

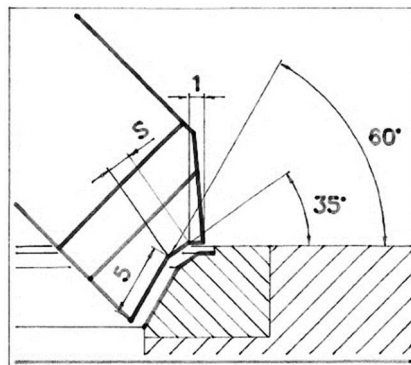


4544 S=3.25mm

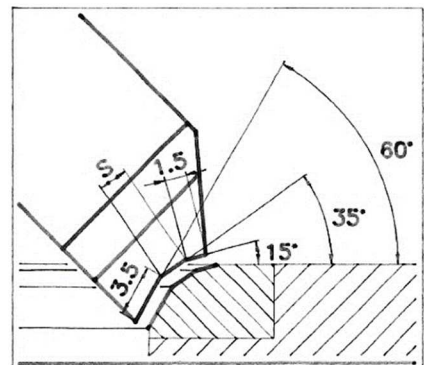
- 13 Formtools 35°/ 38°**
- 13 Formstähle 35°/ 38°**
- 13 Outils de façon 35°/ 38°**
- 13 Skärstål 35°/ 38°**
- 13 Utensili ad angolazione multipla 35°/ 38°**
- 13 Cuchillas de mandrinado moldeada 35°/ 38°**



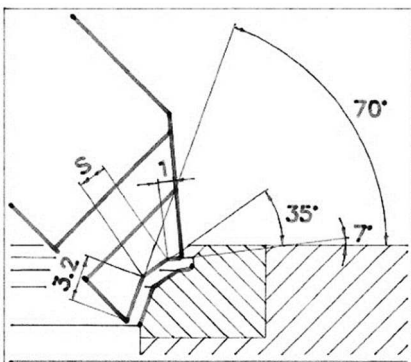
4529 S=1.5mm



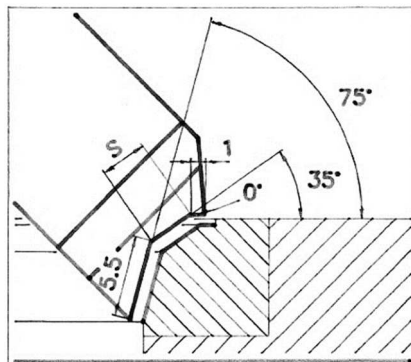
4508 S=1.7mm



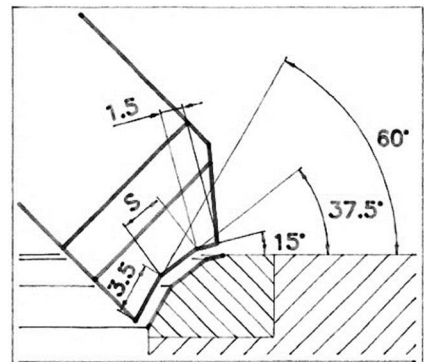
4503 S=2.0mm



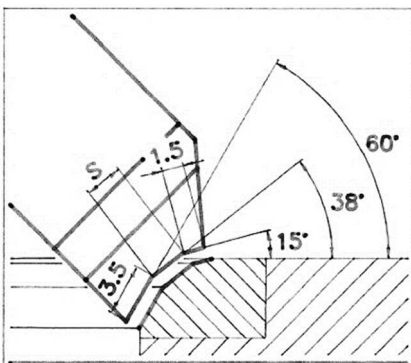
4542 S=2.0mm



4507 S=3.2mm

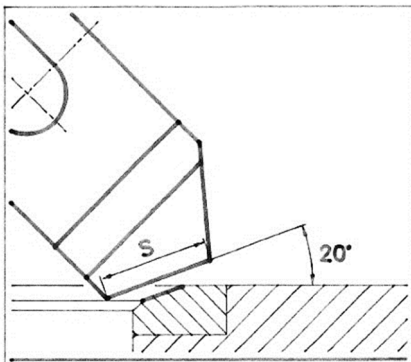


4558 S=2.0mm

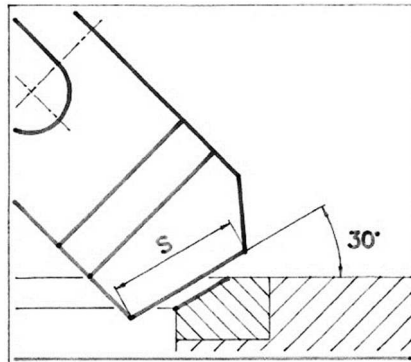


4505 S=2.6mm

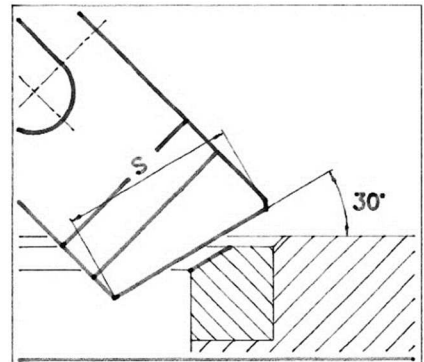
- 14 Formtools for corrections**
- 14 Formstähle für Korrekturen**
- 14 Outils de façon pour dégagements**
- 14 Skärstål för reducering**
- 14 Utensili ad angolazione multipla per correzioni**
- 14 Buriles para correcciones**



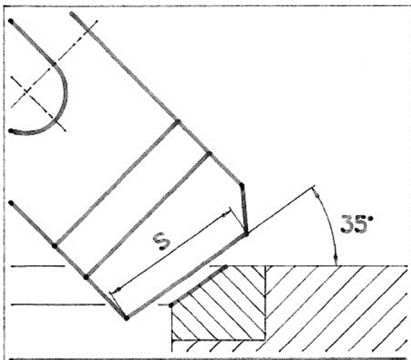
306 S=7.5mm



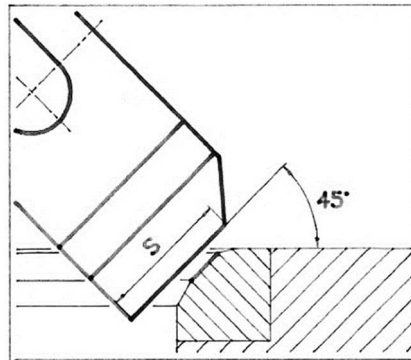
302 S=9.0mm



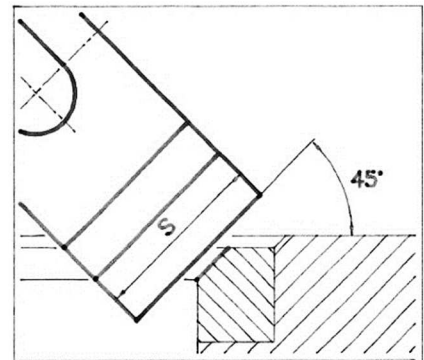
305 S=12.0mm



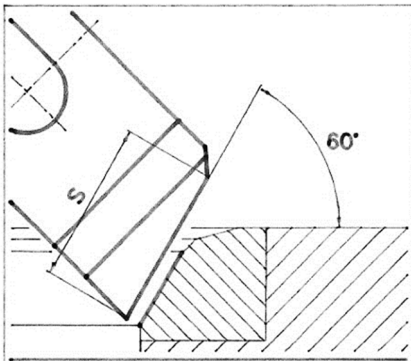
303 S=10.0mm



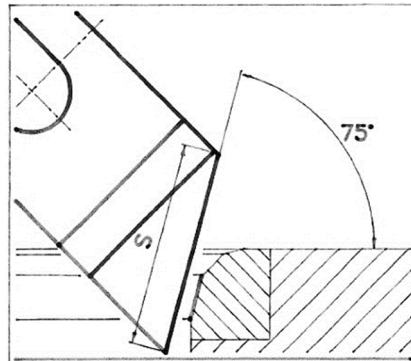
301 S=9.0mm



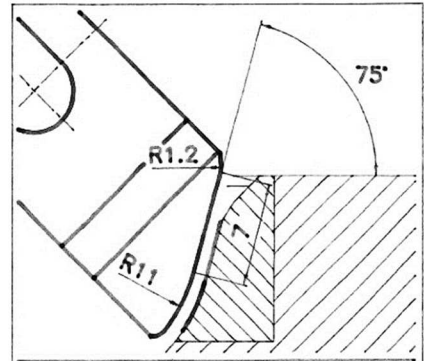
304 S=12.0mm



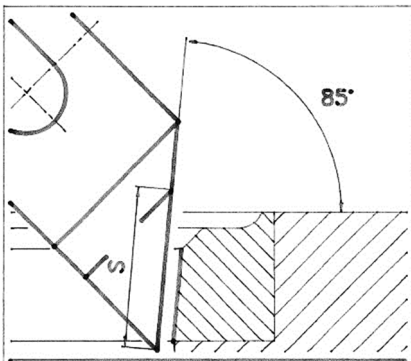
362 S=11.0mm



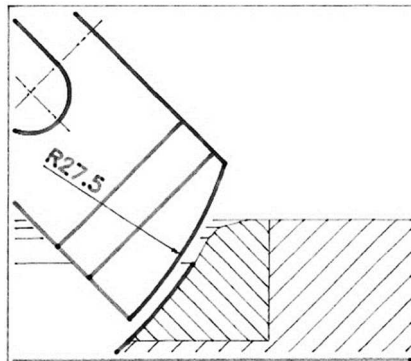
351 S=14.0mm



353

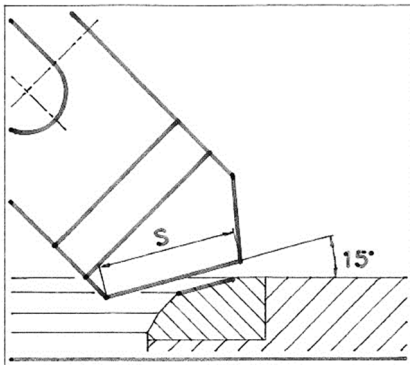


365 S=12.0mm

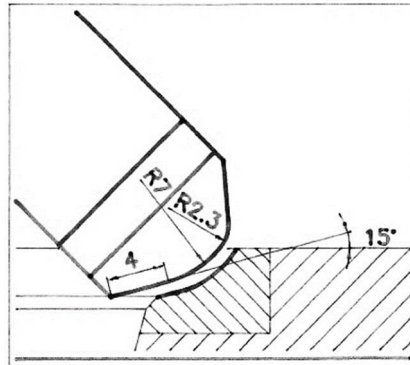


358

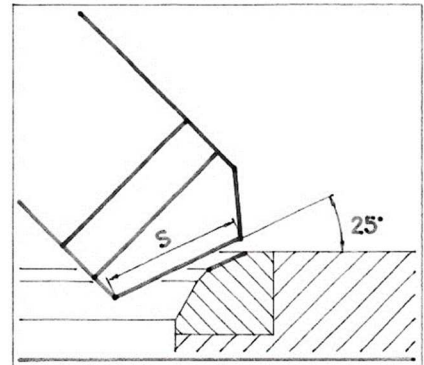
- 15 Formtools for corrections and counterbores
- 15 Formstähle für Korrekturen und Ringsitze
- 15 Outils de façon pour dégagements et l'usinage de logements
- 15 Skärstål för reducering och ringsäten
- 15 Utensili ad angolazione multipla per correzioni e per anelli
- 15 Buriles para correcciones y anillos de asiento



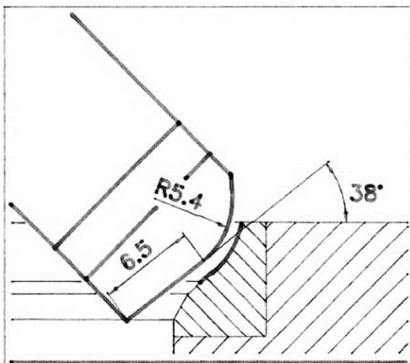
352 S=9.5mm



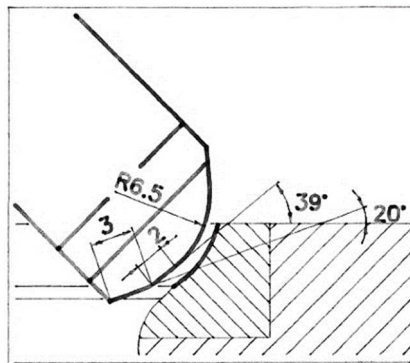
354



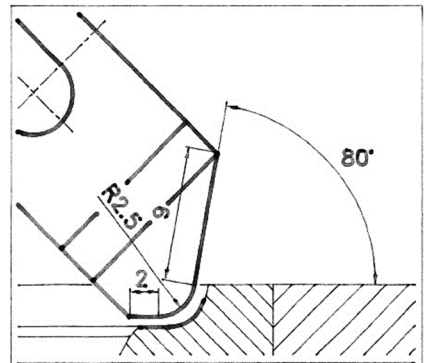
360 S=9.5mm



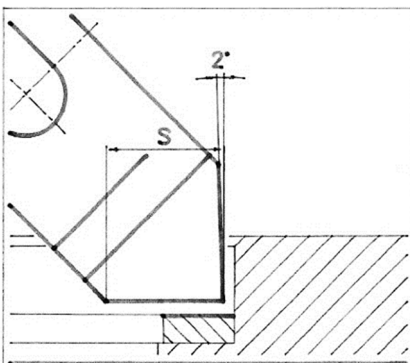
355



357



363



390 S=8.0mm

Alle Angaben sind ohne Gewähr von Richtigkeit und Vollständigkeit.

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